L.I.
SH
365
M27r

SECOND REPORT

MARYLAND SHELL FISH COMMISSION

1909

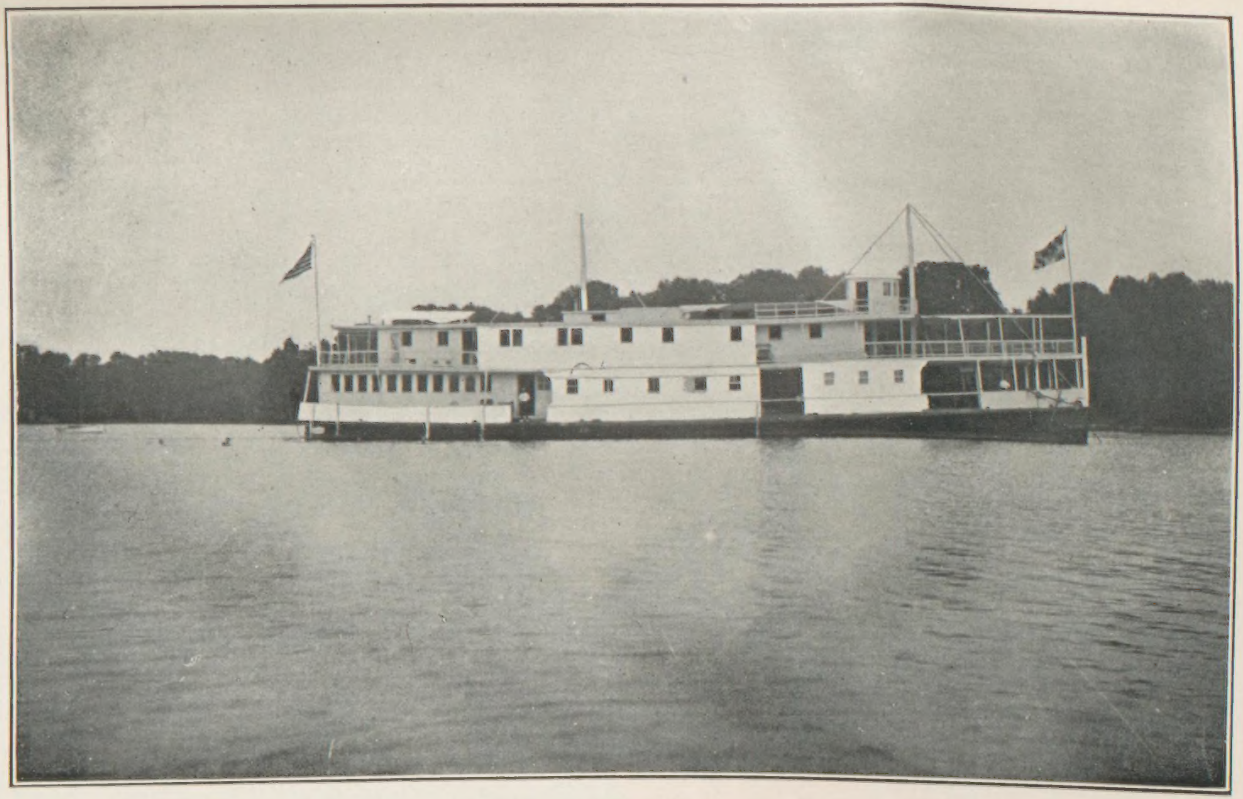
THE FIELD MUSEUM LIBRARY
3 5711 00123 0524

LIBRARY

FIELD MUSEUM OF NATURAL HISTORY
FOUNDED BY MARSHALL FIELD
1893
CHICAGO

University of
Washington

Class ~~494.0815 MA68~~



THE HOUSEBOAT "OYSTER"
HEADQUARTERS OF STATE AND FEDERAL OYSTER SURVEY FIELD PARTIES

Dup

SECOND REPORT

OF THE

SHELL FISH COMMISSION

OF

MARYLAND

1909

85473

PRESS OF
THE ADVERTISER-REPUBLICAN
ANNAPOLIS.

L.I.
SH
365
M27P
v.2

SHELL FISH COMMISSIONERS.

WALTER J. MITCHELL, *Chairman*, La Plata.

CASWELL GRAVE, *Secretary*, Baltimore.
(Johns Hopkins University.)

BENJAMIN K. GREEN, *Treasurer*, Westover.

CHIEF CLERK.

J. D. GARDINER, Bryantown.

ASSISTANT CLERKS.

SAMUEL A. HARPER, St. Michaels.
DANIEL H. CARROLL, CF P., Bel Air.

STENOGRAPHER.

MISS BLANCHE RICHARDSON, Annapolis.

HYDROGRAPHIC ENGINEER.

SWEPSON EARLE, Centreville.

REPORT.

ANNAPOLIS, MD., December 31, 1908.

To His Excellency, Austin L. Crothers, Governor of the State of Maryland, and Members of the General Assembly of Maryland of 1910.

In accordance with the requirements of Section 119 of Chapter 711 of the Acts of 1906, the Board of Shell Fish Commissioners respectfully submits its second report.

WALTER J. MITCHELL, *Chairman.*
CASWELL GRAVE, *Secretary.*
BENJAMIN K. GREEN, *Treasurer.*

TABLE OF CONTENTS.

PAGE.

Letter of transmittal 3

Introduction—

Publications: Reports and Charts 7

Co-operation: U. S. Coast and Geodetic Survey, U. S. Bureau of Fisheries, State Fishery Force, County Commissioners, Hon. John Gill, and Baltimore City Press 8

The Haman Oyster Culture Law—Object, Survey 9

Definition of a Natural Oyster Bar 10

Natural Bar Not Defined, Diversity of Opinion, The Goldsborough Definition, Application of Definition.

Factors of the Definition: The "Livelihood" Factor, Average Price of Oysters, Average Number of Oysters per Bushel, Length of Oyster Season, The *Unit* of Tonging Operations, Area of Bottom Covered by Oystermen, Minimum Number Oysters per sq. yd. Required to Yield Livelihood.

Report of Surveys and Examinations of Oyster Grounds—

Foreword 16

Plan of Report, Distinguishing Features of Maryland Oyster Survey, Names of Practical Oystermen Employed to Conduct Examinations; Observations on: Rate of Flow of Currents, Density of Water, Food Value of Water; Plan for Estimating Condition of Oyster Grounds, Statistics Showing Number of Licenses Issued to Oystermen.

Wicomico County 22

Introduction; Description of Results and Conclusions From Work in Wicomico River, Monie Bay, Nanticoke Sound, and Nanticoke River; Oyster Bars of Wicomico County (Statistical Table).

Worcester County 28

Introduction; Description of Results and Conclusions From Work in Chincoteague Bay; Oyster Bars of Worcester County (Statistical Tables).

Calvert County 34

Introduction; Description of Results and Conclusions From Work in Patuxent River and Chesapeake Bay; Oyster Bars of Calvert County (Statistical Tables).

Charles County 44

Introduction; Description of Results and Conclusions From Work in Patuxent and Wicomico Rivers; Oyster Bars of Charles County (Statistical Tables).

St. Marys County 49

Introduction; Description of Results and Conclusions From Work in Patuxent River, Smiths Creek, St. Marys River, St. George River, Heron Island Sound, Bretons Bay, St. Clement Bay, St. Catherine Sound, Wicomico River and Chesapeake Bay; Oyster Bars of St. Marys County (Statistical Tables).

Methods of Oyster Survey—

Information Furnished 67

Equipment 67

Boats, Houseboat "Oyster," Instruments.

Organization 70

Methods 70

Lines of Soundings, Use of Chain Wire Apparatus, Location of Position at Which Observations Taken on Charts, Records, Selection of Examination Stations.

PAGE.

Field and Office Work—
Anchorage of the Houseboat "Oyster" 78
Tabulated Statement of Operations of Field Party 83
Statistics of Results of Combined Operations of Federal Government and State 85
Buoys—
Staff Buoys 86
Construction, Price, How Established, The Effect of Water and Ice on the Buoys.
Planters Buoys 91
Maintenance Required; Use, Color and Construction; Correspondence With Fifth Light House Inspector Concerning a Buoy for Oyster Planters.
Leased Oyster Grounds—
Foreword 97
Total Number Leases Granted, Total Area Leased, Leases Granted Under Former and Present Laws, Areas Available for Lease to Date, Too Early to Judge of Results of the Law.
Unpaid Rents 98
Table Showing Location and Number of Lots on Which the Lessees are in Arrears with Rent.
Forms of Application 99
Application for a Lease by a Land Owner with Riparian Rights; by an Oysterman, and by a Member of the General Public.
Form of Lease 102
Total Number of Applications for Leases 103
Total Number of Leases Granted 104
Names and Addresses of Lessees—
Anne Arundel County 105
Calvert " 106
Charles " 107
Dorchester " 108
Kent " 109
Queen Annes " 109
St. Marys " 110
Somerset " 111
Talbot " 115
Wicomico " 116
Recommendations—
Introduction 117
Seed Oysters 120
Acreage of Lots for Lease 122
Dredging on Leased Lots 123
Reduction of Rent 124
Rentals Charged by Other States; Rhode Island, Connecticut, New York, New Jersey, Virginia, Louisiana, and Texas.
Collection of Rents 126
Priorities in Leasing 127
Non-residents of the State 127
Financial Statement 129
Text of the Haman Oyster Culture Law 130
Opinions Rendered by Counsel 144
Jurisdiction, Private Ownership and Riparian Rights.
Right of Lot Holders to Take Up Planted Oysters—
Opinion of Attorney-General 146
An Act Setting Aside Clam Rocks in Pocomoke Sound 148
An Act Repealing Calvert County Cultivating Law 149

INTRODUCTION.

PUBLICATIONS.

This Report of the Board of Shell Fish Commissioners is intended to embrace an account of the work of the Commission during the fiscal year ending September 30, 1908, and the part of the following fiscal year to December 31, 1908.

It contains descriptions of the methods and results of the survey and examinations of the oyster grounds of Wicomico, Worcester, Calvert, Charles, and St. Marys counties, and the survey of lots leased for oyster culture; statements regarding the opening of the barren bottoms of Somerset and Wicomico counties for lease and the acts of the Commission intended to promote leasing of barren bottoms for oyster culture; lists of the names of oyster planters who have leased lots from the State; a statement of all receipts and disbursements by the Commission during the fiscal year ending September 30, 1908, and recommendations for such changes in the Haman Oyster Culture Law as the Shell Fish Commission believes to be essential to the success of oyster culture.

During the year Captain C. C. Yates, for the U. S. Coast and Geodetic Survey, prepared and issued two publications,[1] each consisting of a set of charts and a report.

The first was filed in the office of the Commission at Annapolis and with the Clerk of the Circuit Court of Somerset County, July 1, 1908, and contains all information necessary to make a permanent record of the work of the Commission and the Federal Government in Somerset County for all future requirements of the courts. The charts, six in number, show all legal boundaries of oyster bars, crabbing bottoms and clam beds within the adopted boundaries of the waters opened for leasing with Somerset County, and the location of all landmarks used as a foundation for the delineation of these various boundaries. The report gives technical and legal descriptions of all oyster bar and other boundaries, and descriptions of all landmarks shown on the charts.

[1] These publications may be secured by applying to the Superintendent of the Coast and Geodetic Survey at Washington, D. C.

The second publication consists in a set of two charts and a technical report and forms a permanent record, similar in every way to that for Somerset County, of the work of the Commission and the Federal Government in Wicomico County. It was filed in the office of the Commission in Annapolis and in the office of the Clerk of the Circuit Court for Wicomico County, on December 1, 1908.

CO-OPERATION.

The Commission has continued to receive the same hearty co-operation in its field work from the U. S. Coast and Geodetic Survey, the U. S. Bureau of Fisheries, the State Fishery Force, and boards of County Commissioners which it has hitherto received. A full statement of the extent of this co-operation and the Acts authorizing it may be found in the First Report of the Shell Fish Commission, pages 17 to 26. A statement concerning the assistance rendered by the Coast and Geodetic Survey and the Bureau of Fisheries may be found also in the reports published by the Coast and Geodetic Survey entitled "Survey of Oyster Bars."

The names of the men appointed by the boards of County Commissioners to accompany the Chief Engineer during the survey of their respective counties and point out the approximate location of the oyster bars and select the stations on each ground at which examinations were made, are:

J. K. Covington	Tyaskin	For Wicomico County.
William T. Pruitt	Stockton	" Worcester County.
James A. Duke	Broome Island	" Calvert County.
J. F. Robrecht	Piney Point	" St. Marys County.
Z. T. Hayden	Harris Lot	" Charles County.

From these gentlemen the Commission has received much information and help beyond that contemplated in the Act providing for their services and it gladly acknowledges its appreciation of this and many courtesies.

To Hon. John Gill, the Commission desires to express its thanks for the attention he has given to the work of securing the continued co-operation of the Federal Government with the Maryland Shell Fish Commission in making the survey of the natural oyster grounds. Without the assistance of the

U. S. Coast and Geodetic Survey and the U. S. Bureau of Fisheries it would be well nigh impossible to complete the survey within a reasonable period along the lines on which the work was begun.

To the daily press of Baltimore City the Commission hereby expresses its obligation for the encouragement and assistance the cause of oyster culture has received through the many editorials and reports, pertaining to the subject and to the preliminary survey work, which have appeared in its columns. Knowing that a general interest in oyster culture and a knowledge of the conditions under which oyster culture may be successfully carried on, is of prime necessity for the work of perfecting the scheme of legislation such as has been inaugurated by the State of Maryland for the development of the latent possibilities of the barren bottoms of her tide waters, the Commission takes this opportunity to solicit the continued support of the press for the law and especially the advocacy of such amendments to the law as are clearly shown by experience to be necessary to its ultimate success.

THE HAMAN OYSTER CULTURE LAW.

OBJECT.

The Legislature in placing Chapter 711 of the Acts of 1906, better known as the Haman Oyster Culture Law, upon the statute books of Maryland had a two-fold object in view:

1. To *encourage* an industry in oyster culture upon the *barren bottoms* beneath the tidewaters of the State.

2. To *prevent* the leasing of *natural oyster bars* for the purpose of oyster culture.

SURVEY.

To make the leasing of barren bottoms possible and the leasing of natural bars impossible, provision was made for a survey of the natural bars for the purpose of accurately locating and marking the same. It was definitely provided that no barren bottoms should be leased in any part of the State until the natural bars of that region had been surveyed, charted and marked with buoys.

DEFINITION OF A NATURAL OYSTER BAR.

NATURAL BAR NOT DEFINED.

The Shell Fish Commission is instructed by Section 90 of the Haman Oyster Culture Law to exercise its judgment liberally in favor of the natural bars when surveying, chartering and buoying them, but other than this the Commission is uninstructed in this important matter. The responsibility of defining a natural bar is placed upon the Commission.

DIVERSITY OF OPINION.

No definition of a natural oyster bar could be formulated by any man or body of men which would meet with the approval of all the parties concerned. Oystermen, as a rule, hold that all bottoms where oysters grow or have grown naturally even though now practically barren of oysters should be considered natural bars. Other citizens of the State who are not directly interested in the oyster business, but interested in the oyster industry from the standpoint of revenue, hold, as a rule, that no bottoms should be excluded from leasing for oyster culture which, by methods known to oyster culturalists, may be made to yield a greater number of oysters than they now produce.

It should be evident to every one that neither of these definitions could be adopted by the Commission as a basis for determining which of the grounds surveyed are natural bars.

THE GOLDSBOROUGH DEFINITION.

The definition of a natural oyster bar which very nearly approaches a reasonable and satisfactory compromise between the views of the subject held by *oystermen* on one hand and by *oyster culturalists* on the other is that contained in an opinion rendered by Judge Chas. F. Goldsborough in the Circuit Court for Dorchester County in the July term, 1881, in the case of William T. Windsor and George R. Todd vs. Job T. Moore.

This definition has been adopted by the Shell Fish Commission as the basis for the determination of the status of the various oyster bottoms surveyed and is as follows:

"What then is a natural bar of bed of oysters? It would be a palpable absurdity for the State to attempt to promote the propagation and growth of oysters and to encourage its citizens, by grant of land, to engage in their culture, if the lands authorized to be taken up were only those upon which oysters do not and cannot be made to grow. That there may be lands covered by water in the State where no oysters can be found, but where, if planted, they could be cultivated successfully, may be possible, but, if so, I imagine that their extent must be too limited for them to be of much practical, general advantage for the purposes of such a law as the one under discussion; but there are thousands of acres of hard and shifting sands where oysters not only are not found, but where it would be folly to plant them; and these latter it can not be supposed that the State intended to offer to give away, for the simple reason that the State could not help knowing that nobody would have them.

Upon the other hand there are large and numerous tracts where oysters of natural growth may be found in moderate numbers, but not in quantities sufficient to make it profitable to catch them; and yet where oysters may be successfully planted and propagated. In my opinion these can not be called natural bars or beds of oysters, within the meaning of the Act of Assembly, and it is just such lands as these that the State meant to allow to be taken up under the provisions of the above-mentioned section of the Act.

But there is still another class of lands where oysters grow naturally and in large quantities and to which the public are now and have been for many years in the habit of resorting with a view to earning a livelihood by catching this natural growth; and, here, I think, is the true test of the whole question. Land cannot be said to be a natural oyster bar or bed merely because oysters are scattered here and there upon it, and because if planted they will readily live and thrive there; but whenever the natural growth is so thick and abundant that the public resort to it for a livelihood, it is a natural oyster bar or bed and comes within the above-quoted restriction in the law, and cannot be located or appropriated by any individual."

APPLICATION OF DEFINITION.

Before this definition may be of use in determining, accurately and scientifically, the status of an oyster ground, its central idea, "livelihood," must be expanded into accurately determinable factors and these factors must be combined into a practical scheme for investigating the condition of the grounds under consideration.

Stated briefly, a *livelihood* is represented by a *sum of money* obtained from the sale, at a fixed *price*, of a certain *quantity of oysters* gathered in a given *time* from an allotted *area* of ground.

Knowing the value of each of these factors it becomes possible to calculate the number of oysters an oyster ground must produce per acre or per square yard in order that oystermen may secure a livelihood by working upon it.

The factors into which the Commission resolved the livelihood problem; the value assigned to each factor and an outline of the scheme devised for use in examining oyster ground and applying the definition to the grounds examined, are given below.

For a detailed account of the investigations carried on to determine the value of each of the above factors and to develop methods of securing the information needed concerning the condition of oyster bottoms, reference should be made to the First Report of the Shell Fish Commission, pages 32 to 69.

Minimum livelihood of Tongman.....$ 277.75
" " " Dredger.....$1,836.25

Average prices received for oysters per bushel.....$0.60 to $1.00

Minimum livelihood expressed in bushels of oysters:

Price.	*Tongmen.*	*Dredgers.*
$0.60	462 bushels.	3,066 bushels.
$0.75	370 "	2,448 "
$1.00	278 "	1,836 "

Number of marketable oysters per bushel.....329

Minimum livelihood expressed in number of marketable oysters:

Price.	*Tongmen.*	*Dredgers.*
$0.60	151,998 oysters.	1,008,714 oysters.
$0.75	121,730 "	805,392 "
$1.00	91,462 "	604,044 "

Number actual working days in tonging season.....100
" " " " " dredging " 58

Unit of tonging operations.....the "grab"*

* A "grab" is made when the tongs are placed upon the bottom, with the heads open, and the shafts closed *once*.

Average area of oyster bottom covered per "grab" with hand tongs:

Depth of Water.	*Area Covered.*	
1 to 5 feet.	.79 sq. yd.	
6 "	.66 "	
7 "	.55 "	
8 "	.46 "	14-foot shafts.
9 "	.40 "	
10 "	.35 "	
11 "	.31 "	
12 "	.40 "	
13 "	.36 "	
14 "	.33 "	
15 "	.30 "	
16 "	.28 "	22-foot shafts.
17 "	.25 "	
18 "	.23 "	
19 "	.21 "	
20 "	.19 "	

Area covered per "grab" with patented tongs.....1 to 1.3 sq. yd.

Number of "grabs" made per hour by tongmen (Average):

Using Hand Tongs.

Depth of Water.	*Number "Grabs."*
5 feet.	162
6 "	162
7 "	156
8 "	156
9 "	156
10 "	156
11 "	156
12 "	144
13 "	132
14 "	132
15 "	120
16 "	108
17 "	108
18 "	84
19 "	84
20 "	84

Using Patented Tongs.

Depth of Water.	*Number "Grabs."*
18 to 30 feet.	50
30 to 50 "	40
50 to 70 "	33
70 to 90 "	26
90 to 130 "	23

Area covered by tongman per season (Average):

Using Hand Tongs.		*Using Patented Tongs.*	
Depth of Water.	*Area Covered.*	*Depth of Water.*	*Area Covered.*
1 to 5 feet.	21.1 acres.	18 to 30 feet.	10.7 acres.
6 "	17.6 "	30 to 50 "	8.7 "
7 "	14.1 "	50 to 70 "	7.1 "
8 "	11.8 "	70 to 90 "	5.5 "
9 "	10.3 "	90 to 130 "	5. "
10 "	9. "		
11 "	7.9 "		
12 "	9.5 "		
13 "	7.8 "		
14 "	7.2 "		
15 "	5.9 "		
16 "	5. "		
17 "	4.6 "		
18 "	3.1 "		
19 "	2.9 "		
20 "	2.6 "		

Area covered by a dredger (10 ton boat) per season.....464 acres.
Area which must yield a livelihood to a dredger *.....140 "

Number of oysters required per square yard to yield a livelihood to oystermen using hand tongs:

Depth of Water.	*Oysters at $0.60.*	*Oysters at $0.75.*	*Oysters at $1.00.*
1 to 5 feet.	1.58	1.25	.95
6 "	1.86	1.50	1.12
7 "	2.16	1.75	1.30
8 "	2.50	2.00	1.50
9 "	2.83	2.25	1.70
10 "	3.16	2.50	1.90
11 "	3.50	2.75	2.10
12 "	3.83	3.00	2.30
13 "	4.25	3.35	2.55
14 "	4.66	3.70	2.80
15 "	5.16	4.10	3.10
16 "	5.83	4.60	3.50
17 "	6.66	5.25	4.00
18 "	7.50	6.00	4.50
19 "	8.66	6.75	5.20
20 "	10.00	7.60	6.00

* The 90,000 acres of dredging ground (carefully estimated) belonging to the State must yield a livelihood to each of the 638 dredgers licensed to work on it (during the season of 1907 and 1908), hence 140 acres must yield *one* livelihood.

Number of oysters required per square yard to yield a livelihood to oystermen using patented tongs:

Depth of Water.	*Oysters at $0.75.*	*Oysters at $1.00.*
18 to 30 feet.	2.3	1.7
30 to 50 "	2.8	2.1
50 to 70 "	3.5	2.6
70 to 90 "	4.5	3.4
90 to 130 "	5.0	3.7

Number of oysters required per square yard to yield a livelihood to oystermen using a dredge:

	Oysters at $0.60 per bu.	*Oysters at $0.75 per bu.*
At all depths.....	1.44	1.18

REPORT OF SURVEYS AND EXAMINATIONS OF OYSTER GROUNDS.

FOREWORD.

As in the former report, the survey of the oyster grounds is described herein as having proceeded from north to south in the counties on the Western Shore, and from south to north in the counties on the Eastern Shore. Grounds located in sections designated by law for the exclusive use of tongmen in each county are described first, the descriptions of grounds on which scrapers or dredgers may work following.

All facts relating to natural oyster bars which lend themselves to a statistical form of presentation, such as names, dates, areas, numbers of corners, conditions as represented by number of oysters per square yard or bushels of oysters per acre, are included in tables, one set for each county, placed after the text in each case. Subject-matter which can not be satisfactorily reported by the statistical method is given in the text.

The feature of the Maryland survey which distinguishes it from former surveys of oyster grounds and which gives it its right to be considered a real investigation of the oyster grounds of Maryland, is that of the series of examinations carried on in connection with the lines of soundings and chain-wire readings. The results of these examinations constitute the basis upon which the status of the grounds, whether natural oyster bar or leasable bottoms, is determined by the Commission. It was very early realized that the accuracy of the final result of the survey depends almost entirely upon the number and proper location of the stations at which examinations are made on the oyster grounds in each locality and an endeavor has been made to increase the number of these examinations to the fullest capacity of the equipment at hand and to perfect the method by which the examinations are conducted. The number of examinations made this season (2,252) more than doubles the number (988) made during the season of 1907, and is about five times the number (440) made in 1906.

The names of the practical oystermen engaged by the Commission to make the examinations of the bottoms surveyed during the period covered by this report, are given in the list which follows:

"THE INVESTIGATOR"
AS MANNED AND EQUIPPED FOR EXAMINING OYSTER GROUNDS

W. E. Revelle	Wicomico	County	162	examinations.
W. E. Revelle	Worcester	"	147	"
T. E. Wroten	Calvert	"	638	"
L. J. Tucker	"	"	14	"
W. H. Robrecht	"	"	15	"
T. E. Wroten	Charles	"	22	"
W. H. Robrecht	"	"	40	"
John Stein	"	"	51	"
T. E. Wroten	St. Marys	"	399	"
L. J. Tucker	"	"	17	"
W. H. Robrecht	"	"	785	"
J. Henderson	"	"	159	"
John Stein	"	"	112	"

Observations on the rate of flow of currents over the grounds at the examination stations have been largely discontinued this season because the time required for making them has been needed for multiplying the number of examinations of the oyster grounds and also because of the availability of the extensive series of current observations made in the Bay by the Coast and Geodetic Survey. The results of these observations can be supplemented in any particular locality when needed.

Observations on the density of the water in each locality at the time of the survey and on the character of the bottom upon which the oyster bars are found, have been continued and samples of water have been regularly taken from the oyster bars for a study of the quantity and quality of the available oyster food, as this work in no way retards the progress of the survey.

No attempt is made either in the text of this report or on the published charts to give information with regard to the limits or extent of the various kinds of bottom on which the oyster bars were found to extend but such information may be secured for any of the grounds covered by the survey by reference to the records of the surveys and examinations which are filed in the office of the Commission at Annapolis.

In making the estimates of the quantity of marketable oysters each natural bar may be expected to yield during the season following that of the survey, it is estimated that *one-third* of the marketable oysters available on the bottom one season, will remain on the bar at the end of the season, and that *one-half* of the oysters which are less than two and one-half inches in length (culls) one season, will have grown to

marketable size before the opening of the next. These estimates are intended to show whether the bars are tending toward depletion or toward continued productivity. They are thought to be fairly accurate for such natural bars as have a hard foundation, for on such bars, oysters and shells are usually fairly evenly distributed. For bars which cover bottoms composed of soft mud the estimates are not to be considered accurate, because on such bottoms oysters grow in dense patches or lumps, the bottom between being entirely barren.

The quantities of oysters taken by the tongmen at the examination stations are made the basis for the estimates of the yield of the natural bars, and the estimated yield is therefore in excess of the actual, for the stations selected by the local assistants for examination are usually those which the chain-wire apparatus indicated to be better stocked with oysters than the adjacent areas.

The number of licenses issued to oystermen during successive oyster seasons affords an index to the general condition of the public oyster grounds in the various parts of the State, and supplies a fairly satisfactory basis upon which to estimate the total quantity of oysters yielded by the public oyster grounds of the State during any particular season. For this reason the following tables are introduced, all but the first having been taken from an article, in the Bulletin of the U. S. Fish Commission for 1892, entitled "The Oyster Industry of Maryland," by Charles H. Stevenson.

An approximately correct estimate of the total number of bushels of oysters taken from the public oyster grounds during any oyster season may be secured by multiplying the total number of licenses issued that season to *tongmen, scrapers* and *dredgers,* by 450, 1,500 and 3,500 respectively, these numbers representing the quantity of oysters a tongman, scraper or dredger must catch during an oyster season in order to have secured a livelihood.

It often happens during seasons when oysters are scarce or are poor in quality or when the price of oysters is abnormally low, that oystermen do not continue to work throughout the entire season and for such seasons the *estimated* total yield of the oyster grounds, made on the proposed basis, would likely be very considerably greater than the *actual* yield.

TABLE SHOWING ALL LICENSES ISSUED TO OYSTERMEN IN MARYLAND DURING THE OYSTER SEASONS OF 1906-1907 AND 1907-1908.

County.	*To Tongmen.*		*To Scrapers.*		*To Dredgers.*	
	1906-7.	1907-8.	1906-7.	1907-8.	1906-7.	1907-8.
Anne Arundel	847	770	....	....	13	6
Calvert	733	754	....	....	23	24
Charles	197	260	....	....	1	0
Dorchester	1,168	1,054	401	412	83	72
Kent	449	541	....	....	....	....
Queen Anne	429	497	....	....	....	....
Somerset	513	376	428	324	320	371
St. Mary	1,015	1,044	....	....	50	78
Talbot	632	706	101	104	18	21
Wicomico	576	435	....	....	4	5
Worcester	No License Required.					
Baltimore City	....	....	....	....	32	61
Total	6,559	6,437	930	840	544	638

TABLES SHOWING NUMBER LICENSES ISSUED TO OYSTERMEN FROM 1865** TO 1893.

To Tongmen.

Years.	Somerset.	Wicomico.	Dorchester.	Talbot.	Queen Anne.	Kent.	Anne Arundel.	Calvert.	St. Marys.	Charles.	Worcester.	Total number of boats.	Total number of men.
1865-66	267	89	243	212	116	117	162	139	229	19	65	1,658	.....
1866-67	263	86	251	234	103	98	193	157	220	15	64	1,684	.....
1867-68	234	92	220	241	146	84	218	183	284	21	80	1,803	.....
1868-69	246	110	257	246	105	93	222	189	336	22	81	1,907	.....
1869-70	128	115	210	202	67	77	223	180	309	16	120	1,647	.....
1870-71	178	112	331	199	115	103	234	145	267	8	(*)	1,692	.....
1871-72	252	106	441	184	119	96	240	146	220	12	(*)	1,816	.....
1872-73	245	195	575	274	178	95	300	324	362	48	(*)	2,596	.....
1873-74	125	125	405	280	183	109	421	380	307	22	(*)	2,357	.....
1874-75	329	172	472	294	210	120	314	237	325	50	*291*	2,523	*291*
1875-76	239	98	280	276	172	101	396	207	272	49	*241*	2,090	*241*
1876-77	72	88	212	254	146	101	250	186	244	28	*193*	1,581	*193*
1877-78	59	133	182	217	139	106	348	198	197	23	*170*	1,602	*170*
1878-79	2	108	142	258	144	122	343	243	212	30	*211*	1,604	*211*
1879-80	2	134	199	281	145	123	301	312	183	41	*106*	1,721	*106*
1880-81	37	173	291	386	391	137	310	306	297	101	*237*	2,429	*237*
1881-82	17	171	317	371	389	114	342	314	350	118	*360*	2,503	*360*
1882-83	25	197	353	294	511	138	364	269	386	93	*333*	2,630	*333*
1883-84	106	183	387	260	501	181	358	259	366	180	*336*	2,781	*336*
1884 85	756	296	696	457	648	250	407	392	663	176	*153*	4,741	*153*
1885-86	536	300	736	453	263	267	456	367	618	136	*62*	4,132	*62*
1886-87	317	344	742	430	248	245	472	317	610	130	*97*	3,855	*97*
1887-88	207	340	839	450	251	262	512	359	582	112	*126*	3,914	*126*
1888-89	191	289	861	490	284	267	560	423	558	132	*110*	4,055	*110*
1889-90	176	297	948	559	364	316	607	461	626	136	*145*	4,490	*145*
1890-91	355	304	1,003	*1,257*	*1,112*	*769*	650	521	757	155	*183*	3,745	*3,301*
1891-92	330	333	933	*727*	*1,064*	*862*	615	531	759	122	*100*	3,623	*2,753*
1892 93	*546*	*649*	*1,599*	*1,103*	*939*	*741*	*1,115*	*808*	*1,...*	*188*	*172*	.....	*9,081*

** The license system adopted at this time.

* Tongmen exempt from license system.

Figures in italics indicate that licenses were issued to the men, in other instances the boats were licensed, in which case, *as a rule*, count two tongmen to each boat.

*To Scrapers.**

Season.	Somerset.	Dorchester.	Talbot.	Total.
1869-70	283	.....	.....	283
1870-71	359	125	.....	484
1871-72	453	130	.....	583
1872-73	276	132	.....	408
1873-74	224	106	.....	330
1874-75	322	149	59	530
1875-76	209	180	40	429
1876-77	165	142	47	354
1877-78	59	142	27	228
1878-79	151	157	34	342
1879-80	57	134	29	220
1880-81	292	148	30	470
1881-82	173	153	83	409
1882-83	278	177	64	519
1883-84	262	218	64	544
1884-85	469	310	100	879
1885-86	370	402	125	897
1886-87	428	334	93	855
1887-88	337	373	85	795
1888-89	262	433	85	780
1889-90	356	502	105	963
1890-91	632	550	116	1,298
1891-92	640	582	78	1,300
1892-93	647	483	102	1,232

* Scraping first authorized in 1854 in Somerset County; in Dorchester in 1870, and in Talbot in 1874. Records of licenses issued in Somerset County prior to 1869 not available.

To Dredgers.

Season.	No. of Licenses.	Season.	No. of Licenses.
1865-66	391	1879-80	327
1866-67	401	1880-81	531
1867-68	438	1881-82	728
1868-69	563	1882-83	674
1869-70	642	1883-84	501
1870-71	637	1884-85	955
1871-72	597	1885-86	879
1872-73	559	1886-87	811
1873-74	621	1887-88	807
1874-75	538	1888-89	943
1875-76	691	1889-90	860
1876-77	677	1890-91	821
1877-78	565	1891-92	770
1878-79	465	1892-93	719

WICOMICO COUNTY.

Wicomico County divides with Somerset County the oyster-producing waters of Wicomico River, Monie Bay and Nanticoke Sound, and with Dorchester County the waters of Nanticoke River. The deep water channel in each case constitutes the boundary line.

The natural oyster bars in all of these waters have been designated by law for the use of tongmen only.

Nearly all of the grounds pointed out by the local representative of the county, Mr. James K. Covington, to be surveyed were found to be sufficiently well stocked with oysters to be classed as natural oyster bars, 115 acres only having been found to be barren bottom. The total area of bottom included within the areas charted and buoyed as natural oyster bar is 2,038 acres.

The rule by which the status of the grounds was determined is the same as that adopted for use in Somerset County and is given in the form of a table on page 14.

The table on page 27 gives the number and name of the oyster bars and indicates the condition of each at the time of the survey.

Observations on the rise and fall of the tide were carried on during the survey of the county at Great Shoals Lighthouse, this station being centrally located in Monie Bay between the mouths of Wicomico and Nanticoke rivers. The mean range of the tide during the period was 2.5 feet, the maximum range, 3.4 feet.

The number of lots leased from the State under former laws for oyster culture in Wicomico County and now held under the Haman Oyster Culture Law, is 18, covering an area of 84⅛ acres. The original surveys of all these lots were verified by the engineers while the survey of the oyster grounds was in progress, record being made of the starting point for each survey as well as the location of the corners of the lots.

WICOMICO RIVER.

(Shown on Chart of Natural Oyster Bars, No. 12.)

The part of Wicomico River lying within the limits of Wicomico County (above a line marking the deep water channel) contains two small oyster bars —*Holland* bar, containing 5 acres, and *Ingram Shoal* bar, containing 20 acres. Both bars lie in the deeper water of the river near the channel but both have been formed on portions of the bottom considerably elevated above the bottoms immediately surrounding them. The depth of water over *Holland* bar varies from 11 to 17 feet and the bottom seemed to be everywhere soft. The depth over the hard sandy ridge on *Ingram Shoal* is 6 to 10 feet, the bar ending on very soft mud near the river channel in water 15 feet deep.

A brief description of Wicomico River and the conditions affecting the growth of oysters in its waters is given on pages 161 and 162 of the First Report of the Shell Fish Commission, the survey of the oyster grounds in the section of the river belonging to Wicomico County having been carried on at the same time as that of the Somerset County section.

Practically all of the bottoms of the river are open for lease for oyster culture.

MONIE BAY.

(Shown on Chart of Natural Oyster Bars, No. 12.)

The area of the section of Monie Bay which lies within the limits of Wicomico County is only about 600 acres in extent but it is more than half occupied by *Great Shoals* oyster bar. This bar, as charted and buoyed, covers 441 acres but about 100 acres of it lie in Nanticoke Sound. An oyster bar locally known as *"East Hill"* bar is included within the limits of *Great Shoal bar,* the two being separated in nature by a narrow sand bar. The oyster bar begins on the hard sandy bottom near the six-foot curve on the north and extends to the very soft mud of the river channel on the east and south where the water is 14 and 18 feet in depth respectively.

A description of the limits of Monie Bay and some of the conditions prevailing there during the summer of 1907 is given on page 161 of the First Report of the Shell Fish Commission.

NANTICOKE SOUND.

(Shown on Chart of Natural Oyster Bars, No. 12.)

The limits of Nanticoke Sound as established by the Shell Fish Commission are described on page 157 of its First Report.

The section of the Sound which belongs to Wicomico County covers about 2,250 acres of which more than one-third is occupied by natural oyster bars;—a part of *Great Shoals* bar (about 100 acres) in the east, a part of *Middleground* bar (about 740 acres) in the central part, and *Big Hill* bar containing 13 acres in the western part.

Hard sandy bottoms covered with water 9-12 feet in depth form the central and by far the greater part of *Middleground* bar. Strips of soft muddy bottom lie along both the east and west sides, the former covered by shallow water, the latter dipping suddenly, in the region of the river channel, to a depth of more than 30 feet. *Big Hill* bar has a depth of 12 feet over its central part but depths of 18-20 feet are found at its edges. The bottom surrounding *Big Hill* bar is composed of very soft mud.

The minimum and maximum densities of the water observed over the oyster grounds during the month of October were:

Great Shoals bar.....1.010 to 1.0114
Middleground bar .....1.011 to 1.0124

The exchange of water between Tangier Sound and its tributaries above, takes place through Nanticoke Sound and the currents are therefore of very considerable volume. The maximum rate at which they were observed to flow over *Middleground* bar was 1.36 mile per hour; over *Great Shoals* bar, 1.08 mile per hour.

Although conditions are unusually favorable in this section for producing oysters, it is doubtful if the proportion of oyster ground to barren bottom could be much increased without causing unfavorable results. The records of examinations of the oyster bars made during the survey indicated that at the beginning of this season there would probably be on the natural bars of the section a quantity of oysters sufficient to make an average of not less than 70 bushels of

marketable oysters for every acre (natural bar and barren bottom) in the entire section or about 5 oysters for every square yard.

NANTICOKE RIVER.

(Shown on Charts of Natural Oyster Bars, Nos. 11 and 12.)

The oyster producing section of Nanticoke River extends from the mouth of the river to a point about eight miles above. Eleven natural oyster bars were found in the part of the river belonging to Wicomico County, which aggregate a total area of 816 acres.

The oyster grounds in the part of the river belonging to Dorchester County were surveyed also, it being a matter of considerable economy in both time and expense to complete the work in the whole of Nanticoke River with one set of operations. It is necessary to have signals erected on both sides of the river and to have the entire system of triangulation completed in order to carry on the survey of the oyster grounds in either half of the river and, now having completed the survey of the entire river, this work will have to be done but once. In several cases also one series of lines of soundings served to ascertain the limits of oyster grounds on both sides of the channel.

Records of all work done in the half of the river belonging to Dorchester County are on file for use in the construction of charts when the survey of all of the waters of Dorchester County shall have been completed.

The bar known as *Roaring Point* is the only one in the river which may properly be called a deep water bar. It is situated in the main river channel off Roaring Point in water having a depth of 10-18 feet. *Middleground, Wilson Shoals* and *Long Shoal* bars are similarly situated, in the middle of the river, but in each case the greater part of the oyster producing area is formed by sandy shoals covered with water from 5 to 12 feet in depth.

A sandy ridge or shoal lying parallel with the shore, occupies the middle of the river from Ragged Point to the mouth of Wetipquin Creek, and apparently it has been in connection with this elevated area that *Long Shoal* bar and part of *Wilson Shoals* bar have been formed. A second sandy shoal

about two miles long and one-eighth mile wide lies to the east of the one just mentioned, the two being separated by a deep muddy slough except at the lower end where the shoals join. In connection with the latter shoal five small oyster bars have been formed,—*Cherry-Tree*, *Cedar-Shoal*, *Old-Womans-Patch*, *Hickory-Nut* and *Sand-Lump*. The greater part of the bottom covered by each of these bars is composed of hard sand but in each case the oyster-producing bottoms have extended to and upon the adjoining soft mud.

In the part of the river above the mouth of Wetipquin Creek two bars were found,—*Wetipquin* bar and *Upper Stake* bar. The bottom of the former is formed of soft sand covered with water from 9 to 14 feet in depth. *Upper Stake* bar once included and was probably formed in connection with the sandy shoal lying just above it. The lower third of this bar has a bottom of soft mud and sand, the upper part being hard. The water over it is 7-11 feet deep.

The densities of the water observed during the survey over the bars in Nanticoke River are as follows:

Roaring Point, East bar	1.011 to 1.012
Wilson Shoals bar	1.0102 to 1.011
Cedar Shoal bar	1.0094 to 1.0106
Wetipquin bar	1.0094 to 1.011
Upper Stake bar	1.009 to 1.011

The bottoms available and well adapted for oyster culture, aggregating an area of about 500 acres, are found just above *Upper Stake* bar, between *Wetipquin* and *Sand Lump* bars, on the shoal in the middle of the river above *Long Shoal* bar and in part of Ragged Point and Roaring Point coves.

NATURAL OYSTER BARS OF WICOMICO COUNTY.

Number of bar	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters per Sq. Yd. as Calculated from Records of Examinations		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1907-1908.	Season of 1908-1909.	Season of 1907-1908.	Season of 1908-1909.
		Wicomico River.										
1	Holland	Sept. 14, 1907.	5	4.5	4	4	1.6	3.4	50.0	27.9	225	126
2	Ingram Shoal	Oct. 10, 1907.	20	26	3	3	35.5	29.8	438.2	405.9	8764	8118
		Monie Bay.										
3	Great Shoals	Oct. 9, 10 & 11, 1907.	441	386	5	5	6.7	9.6	141.1	95.5	54464	36863
		Nanticoke Sound.										
4	Middle Ground	Oct. 10, 11, 18 & 23, '07	1123	881	8	8	15 3	6.2	91.1	142.5	80259	125542
5	Big Hill	Oct. 10, 1907.	13	11	4	4	28.4	4.6	67.6	230.8	743	2538
		Nanticoke River.										
6	Roaring Point, East	Oct. 18, 1907.	35	*42	4	4	24.5	8.7	127.8	222.0	4473	7770
7	Wilson Shoals	Oct. 18, 19 & 22, 1907.	233	**164	6	6	18.0	4.0	58.8	151.5	9643	24846
8	Cherry Tree	Oct. 22, 1907.	8	4.5	3	3	20.8	9.3	136.7	198.5	615	893
9	Cedar Shoal	Oct. 22 & 23, 1907.	37	30	4	4	36.5	4.1	60.2	286.7	1806	8601
10	Long Shoal	Oct. 22, 1907.	14	10	3	3	17.5	2.7	39.6	141.1	396	1411
11	Old Woman's Patch	Oct. 22, 1907.	8	10	3	3	35.0	2.0	29.4	266.1	235	2129
12	Hickory Nut	Oct. 22, 1907.	16	13	3	3	12.8	3.4	50.0	110.2	650	1433
13	Sand Lump	Oct, 22, 1907.	4	3	3	2	5.9	3 1	45.3	57.3	137	172
14	Wetipquin	Oct. 24 & 25, 1907.	24	31	3	3	4.5	3.2	47.0	48.5	1128	1164
15	Upper Stake	Oct. 25 & 31, 1907.	57	61	4	3	4.1	1.4	20.5	36.7	1168	2092
		Total	2038	1677								

*Part of "Roaring Point East" lies in Dorchester County waters.

**"Wilson Shoals" includes five small bars.

WORCESTER COUNTY.

CHINCOTEAGUE BAY.

(See Charts of Natural Oyster Bars, Nos. 13, 14 and 15.)

The waters of Worcester County which, at the present time, are adapted for the growth of oysters are included in the part of Chincoteague Bay lying north of the Maryland Virginia State boundary line.

Prior to the date of the closing of the Popes Creek Inlet the natural oyster bars of the Chincoteague Bay were much more extensive and productive than now and some natural bars were to be found in Sinnepuxent Bay also. When this inlet became closed, however (it being the chief source of salt water for the upper part of Chincoteague Bay and Sinnepuxent Bay), the waters of the upper part of Chincoteague Bay gradually became too fresh to support a rapid growth of oysters and so fresh during exceptionally wet seasons that oysters were killed. The waters of Sinnepuxent Bay became so fresh that their value for growing oysters was entirely destroyed.

Assateague Island, which forms the barrier separating Chincoteague and Sinnepuxent Bays from the Atlantic Ocean, is very narrow at several places and the practicability of cutting an inlet through it to bring about an exchange of water, through the action of the tide, between these bays and the ocean and thus to restore to these waters their former value for producing oysters, has suggested itself many times.

The Sinnepuxent Salt Water Inlet Company has been formed to excavate such an inlet at some point between Fenwick Island and Green Run and, in 1906, the State entered into an agreement with this Company whereby the Company is to receive a patent to about 19,000 acres of bottoms in Chincoteague, Sinnepuxent and Isle of Wight bays, for the purposes of oyster culture, when the waters of the bays named shall have been made sufficiently salt to support oysters through the influence of the salt water introduced through the inlet cut and maintained by the Company.

Of the 40,000 acres of bottom, more or less, retained by the State in Chincoteague and Sinnepuxent bays, about 20,000 acres adjacent to the prospective holdings of the Sinnepuxent Salt Water Inlet Company have no value at the present time for producing oysters. The only condition necessary to be supplied, however, to give this entire area a very considerable value for growing oysters is apparently that of a proper salinity to the water covering it. If the Sinnepuxent Salt Water Inlet Company should succeed in introducing a quantity of salt water through the proposed inlet sufficient to raise and permanently maintain the density of the water over this area to the point at which oysters thrive, the State will then be able to derive a very adequate return for the loss of the bottoms granted to the Company through the rents it will receive for the use of the bottoms adjacent to the holdings of the Company covered with the water salted by the inlet, provided, of course, the Haman Oyster Culture Law continues to apply to the waters of Worcester County.

The natural oyster bars[1] in Chincoteague Bay are 28 in number and cover a total area of 1,655 acres. They are found in two groups; one situated in the vicinity of Brockatonorton Bay, the other between Snow Hill Landing and South Point. In the first group the bars are distributed from one side of the bay to the other, but in the second they are confined to the western side of the bay. Oysters grow much more rapidly and are of a much better quality on the bars of the first or southern group than on the bars of the northern group, due to the fact that the water is much more dense in the southern part of the bay than in the northern or upper part. There are often periods extending over several weeks during the late winter and early spring when the water over the upper part of Chincoteague Bay is too fresh for oysters to thrive or even live in and it is only during dry seasons that the density of the water in this locality becomes sufficiently high to permit of a rapid growth in oysters. The conditions in the southern part of the bay are better adapted for the growth of oysters because of the supply of salt water coming into it from Chincoteague Inlet, which connects Chincoteague Bay with the Atlantic at the southern end of Chincoteague Island, and also on account of the more rapid flow of water which takes place in this part of the bay. The greater velocity of

[1] See table on pages 32 and 33.

the currents in the section occupied by the southern group of oyster bars is due to the fact that the bay is much narrower here than above or below and is, in addition, considerably filled with marshy islands. Currents having a velocity of from .52 to .56 mile per hour were observed in the vinicity of *White* and *Toby* bars.

During the period occupied by the survey of the oyster grounds of Worcester County, November 30 to December 17, 1907, the density of the water over the oyster bars of the southern group varied from 1.009 to 1.013, and from 1.005 to 1.009 over those of the northern group. It should be borne in mind that the survey was made at the time of year when the density is highest, and that the water must be very much fresher during the spring than is indicated by the above figures.

Nearly all of the oyster bars are located inside the six-foot depth curve and on none of the bars was a depth greater than eight feet observed. Perhaps four feet at mean low water is the average depth of water over the natural bars.

Hard sandy bottoms prevail on almost all of the oyster bars, soft muddy bottoms having been found at but few of the examination stations.

A tide station was maintained from November 29th to December 18, 1907, at George's Island Landing and, according to the observations made at this station, the mean range of the tide in Chincoteague Bay is .7 foot, the maximum range, 1.2 foot.

Evidence was not wanting that the conditions in Chincoteague Bay were more favorable for the growth of oysters at the time the survey of the oyster grounds was carried on and for about two years preceding, than they had been for a period of about twenty years. During the summer of 1905 a liberal set of spat became attached to the shells on all of the shelly areas in the bay,—the first set which had been secured in many years. These oysters on the bars situated in the upper part of the bay had made very little growth, but were alive and in a condition to be valuable seed for planting in waters more salt. Unless the projected inlet is cut through Assateague Island, the oyster bars located in the part of the bay subject to freshets disastrous to oysters, should be designated for supplying seed oysters to planters.

Barren bottoms suited to the needs of oyster culture aggregating about 2,000 acres, in addition to the 215 acres [1] of bottoms surveyed and examined but excluded from the area buoyed as natural oyster bar, are to be found in the section of the bay south of a line drawn from the mainland through *Purnell Hammock* bar to Whittington Point on the Assateague Island side. A part of this bottom is now held and used for oyster culture by about forty oyster planters. It has not been necessary, however, in Worcester County for oyster planters to take out leases to the bottoms used by them for oyster culture and accurate information concerning the number of acres under cultivation could not be secured.

[1] The table by which the status of the surveyed bottoms were determined is found on page 14.

NATURAL OYSTER BARS OF WORCESTER COUNTY.

Number of Bar.	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters Per Sq. Yd, as Calculated From Records of Examination		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1907-1908.	Season of 1908-1909.	Season of 1907-1908.	Season of 1908-1909.
1	Horsehead South	Dec. 17, 1907.	28	37	4	4	1.12	2.05	30.1	18 2	844	510
2	Horsehead North	Dec 17, 1907.	14	14	4	4	16.7	5 7	83.8	150.0	1174	2100
3	White Rock	Nov. 30 & Dec. 3, '07.	287	301.5	5	5	4.2	.85	12.5	35.0	3587	10045
4	Levin Tumps	Dec 3, 1907.	26	41	3	3	5.2	.42	6.2	40.4	161	1050
5	Striking Marsh	Dec. 3, 1907	56	87	3	3	8.6	1.4	20.5	70.6	1148	3953
6	Deep Water	Dec. 2, 1907.	6	8.5	3	3	7.9	1.2	17.6	63.2	106	379
7	Toby	Nov. 30, 1907.	54	46	4	4	11.6	.8	11.7	89.0	538	4094
8	Sheep	Dec. 17, 1907.	29	29	4	4	8.6	2.9	42 6	76.4	1235	2216
9	Mink Tumps	Dec. 17, 1907.	6	4	3	3	4.6	1.4	20.5	41.1	82	164
10	Easter Cove	Dec. 17, 1907	6	6	3	3	44.0	4.1	60.2	342 7	361	2056
11	Big Bay Point	Dec. 7, 1907.	28	28	4	4	29.0	1.7	25.0	222.1	700	6219
12	Kennel	Dec. 2, 7, 1907.	71	112	4	4	11.3	1.8	26.4	91.1	1874	6468
13	Drum	Dec. 7, 1907.	31	31 5	3	3	11.5	1 2	17.6	88.7	546	2751
14	Martin Point	Dec. 11, 17, 1907.	64	72	4	4	54.6	2.2	32.2	411.8	2061	26360
15	Diamond	Dec. 6, 1907.	14	12	3	3	45.9	4.2	61.8	357.4	742	4289
16	Rattlesnake	Dec. 11, 1907.	18	16	4	4	78.8	.5	7.3	582.0	116	9312
17	Beef Creek	Dec. 11, 1907.	5	2	5	5	103.2	2.5	36.6	770.8	73	1542
18	Purnell Hammock	Dec 6, 1907.	6	2.25	3	3	69.6	.35	5.1	512.3	12	1152
19	Southwest	Dec. 6, 1907.	18	13	3	3	107.5	1.5	22.1	797.2	287	10363
20	Scarboro Creek	Dec. 6 & 7, 1907.	125	80.5	4	3	89.0	2.3	33.8	665.4	2721	53565
21	Robins Marsh	Dec. 6 & 7, 1907	246	235	7	5	5.6	1.7	25.0	50.0	5875	11750
22	Sandy Point	Dec. 13, 1907	31	26	4	4	90.6	3.7	54.4	683.9	1415	17781
23	Turpin	Dec. 13, 1907.	19	17.5	3	3	54.9	5.6	82.3	429 4	1441	7514

NATURAL OYSTER BARS OF WORCESTER COUNTY.

Number of Bar.	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters Per Sq. Yd. as Calculated From Records of Examination		Estimate of Average Number Bushels Marketable Oysters per Acre		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1907-1908.	Season of 1908-1909.	Season of 1907-1908.	Season of 1908-1909.
24	Ennis	Dec. 13, 1907.	108	83	4	4	18 2	4.1	60.3	152 9	5005	12691
25	Lambertson Landing	Dec. 13, 1907.	126	124	5	3	25 4	5.3	77.9	211.8	9660	26263
26	Newport	Dec. 13, 1907.	70	57	4	4	36.0	4.6	67 6	286.8	3853	16348
27	Handy Hammock	Dec. 16, 1907.	34	30	4	4	7 0	.95	13.9	57 3	473	1948
28	South Point	Dec. 13 & 16, 1907.	129	125	4	4	11.2	4.3	63.2	102.9	7900	12862
		Total	1655	1668.75								

CALVERT COUNTY.

The oyster-producing waters of Calvert County include those of the Bay, which wash the shores of the county, and the waters of the Patuxent River. Fishing rights in the Patuxent have been granted, however, to the residents of St. Marys and Charles counties and, for the purposes of carrying out the provisions of the laws relating to oyster culture, the mid channel of the river is considered the boundary line between the counties.

The section of the Bay to the east of Calvert County, with the exception of an area within a radius of one-half mile of Plum Point, set aside for the use of tongmen, is designated by law as an area over which oystermen may work with dredges. Dredging or scraping for oysters on the natural oyster bars in the Patuxent River is prohibited, but on account of the fact that oysters grow at great depths [1] over large areas in many places, the use of patented tongs is allowed.

The oysters produced on the bottoms of the Bay and in the section of the Patuxent River below Point Patience are considerably inferior to those grown on the bottoms above Point Patience, hence, in developing tables for use in determining the status of the grounds surveyed, a price of 75 cents per bushel was adopted for oysters grown on grounds in the Bay and in the river below Point Patience, and one dollar per bushel for oysters grown on grounds situated above Point Patience.

An oyster culture law, applicable to Calvert County only, was enacted by the same General Assembly (that of 1906) which enacted the general oyster culture law for the whole State. The Calvert County Law was repealed by the General Assembly of 1908, but the existence of the two conflicting laws during the period when lessees were given the right by the Haman Oyster Culture Law to retain lots legally held on the date of the passage of the General Law (April 1 to October 1, 1906), deterred a very considerable number of lot holders in Calvert County from notifying the Shell Fish

[1] It is not profitable to use hand tongs for gathering oysters in depths of water greater than 22 feet, and quite impossible at depths greater than 30 feet.

Commission of their intention to retain their lots and now, through no fault on their part, their right to hold grounds formerly held, is open to question. The Commission holds it proper in such cases in Calvert County to grant leases for lots legally held on the date of the passage of the Haman Oyster Culture Law to the respective lessees even though no notification of the intention of such lessees to retain their lots was received by the Commission within the prescribed time.

Prior to the date of the work of the Commission in Calvert County and even before the date of the passage of the Haman Oyster Culture Law, a wide difference of opinion among the residents of Solomons Island and vicinity had arisen concerning the condition of certain bottoms in the Patuxent River, known as the Middleground, and concerning the legality of leases which had been granted to private individuals to certain portions of the Middleground for oyster culture.

The dispute had been taken to the Court and a decision had been rendered declaring the bottoms covered by the contested leases to be natural oyster bar and the leases void. The right of the lessees to the oysters *then* on the contested bottoms had been conceded by the Court, however, and the lessees had been given one year in which to remove the oysters. Later this period had been extended to two years.

The period during which the oysters on these lots might be removed by the lessees had not elapsed at the time the survey of the oyster grounds of Calvert County was in progress and the oysters belonging to the lessees were yet on the parts of the Middleground adjudged by the Court to be natural oyster bar.

The right or duty of the Commission under these circumstances to examine the bottoms in litigation and to pass upon their status seemed open to question. It was finally decided to conduct no survey or examinations on any part of the Middleground which had been used at any time for oyster planting purposes for the obvious reason that a survey and examination of such bottoms would reveal nothing concerning the *origin* of the oysters which might be found on the bottoms and nothing concerning the condition of the bottoms *before* they were used for oyster planting purposes.

The bottoms adjoining the Middleground were surveyed and examined with the result that part were found to be natural oyster bar and part were found to be barren bottom.

In accordance with the definition of a natural oyster bar adopted by the Commission, the bottoms in question will become barren bottom when the lessees shall have exercised the right granted to them by the Court to remove the oysters.

No action has been taken with reference to the part of the Middleground under litigation. It has not been shown to be natural oyster bar on the charts and its status must be settled through an appeal.

The number of lots leased under former law and which have been retained by the respective lessees is 59, covering a total area of 230 23-100 acres. All were resurveyed during the survey of the public oyster grounds and new leases have been issued in each case.

PATUXENT RIVER.

(Shown on Charts of Natural Oyster Bars, Nos. 19 and 20.)

The oyster-producing section of the Patuxent River situated within the jurisdiction of Calvert County lies north of the mid-river channel and extends from Drum Point, at the mouth of the river, to, and a short distance above, Hallowing Point opposite the town of Benedict.

A belt of 27 natural oyster bars,[1] interrupted at places by the muddy channels of creeks and by areas of depleted oyster bottoms, aggregating 3,469 acres, occupies about one-fourth of this area. The oyster bars unless partially depleted usually extend to within a short distance of the shore, their inner boundaries being covered at low water to a depth of from one to six feet. Oysters grow in the Patuxent at depths greater than in any other waters of the State. In the vicinity of Point Patience oysters were taken at depths of 120 and 130 feet and the results of the examinations in this deep water showed the bottom to be densely stocked and the oysters to be in a thriving condition. While the oysters may originally have been carried to these deep bottoms from adjoining oyster bars by currents (as many oystermen claim), no evidence was found to indicate that the conditions on the deep

[1] See table on pages 42 and 43.

lying bottoms are not just as favorable for the growth of oysters as those which prevail on the bottoms in shallower water. Depths of water from 50 to 60 feet were frequently found in the course of the survey over productive natural oyster grounds in the part of the river below the mouth of St. Leonards Creek. Above St. Leonards Creek the depths of water over the outer limits of the bars range from 20 to 45 feet.

A satisfactory report on the kind of bottom found to form the basis upon which the natural oyster bars have been developed in the Patuxent River would require a separate description for each bar, but the records of the chain-wire readings, soundings and examinations indicate that, *as a rule,* hard sand forms the bottom between the shore line and the ten-foot depth curve on both sides of the river; that soft mud occupies the middle of the river to about the twenty-foot depth curves on either side, and that the bottoms between the ten and twenty-foot curves is composed of sand and mud mixed in such proportions as to produce a sticky surface sufficiently firm to support oysters and shells at its surface. Exceptions to this rule are to be found at several places, in which very soft bottoms occur in shallow water near shore, especially in the part of the river above Sheridans Point. The bottoms in the very deep water in the vicinity of Point Patience are very hard.

Oyster planting operations will no doubt be confined at first to the bottoms near shore where oysters once grew naturally but the bottom, even in the middle of the river, can without great expense be made suitable for oyster planting and much of it will ultimately be taken up and used for that purpose.

A gradual increase in the density of the water took place in the Patuxent during the period occupied by the survey (June 2-September 2, 1908), a phenomenon which doubtless takes place at a corresponding time each year, a decrease taking place each spring. The unusually severe drought of the summer of 1908 makes it probable that densities as high as those observed over the oyster grounds in the upper part of the river are not usual during corresponding seasons of other years. The following table gives the range of densities observed over the oyster bars in four sections of the river, the maximum and minimum densities observed at each place being given with the dates of the observations. A very considerable daily fluctuation in the density of the water in each

locality is noticeable, due to the tide. When the tide is low the fresh water brought down from the head waters increases the proportion of fresh water in the total volume and lowers the density.

Mouth of the River	June 2nd	1.003	1.0052
	July 8th	1.0052	1.0062
	Sept. —	1.0088	1.0106
Broome Island	Aug. 14th	1.004	1.0054
Battle Creek	Sept. 2nd	1.0046	1.0058
Benedict	Aug. 24th	1.0031	1.0044
	Sept. 2nd	1.0036	1.0058

The observations on the velocity with which the water flows over the oyster bars at certain stages of the tide are too few to be very satisfactory but some of them are given, since, to those familiar with the quantity and quality of oysters produced on the natural oyster bars over which the observations were made, they indicate the rate of flow to be desired over barren bottoms to be leased. In every case the maximum velocity observed is given and in nearly every case the point at which the observation was made is located at a considerable distance from shore. Of all the natural conditions directly affecting the productiveness of oyster grounds the rate of flow of water over them is the least constant and most difficult to calculate. It is influenced by the shape of the neighboring shore line, contour of the bottom, depth of water and by the velocity and direction of the winds. The importance of a knowledge of this factor to an oyster grower is readily seen when it is remembered that the oyster depends solely upon the water to bring it its food. The greater the quantity of water which flows over a given bottom the greater the quantity of oysters which may properly be planted upon it.

Oyster Bar.	*Rate of flow observed over it.*
Swash	.47 mile per hour.
South East Middleground	.56 " " "
Barn Gate	.85 " " "
Broome Island	.75 " " "
Prison Point	.61 " " "
Hallowing Point	1.33 " " "

A very few of the specimens of water collected from the oyster bars have thus far been examined with reference to

the quantity of food they contain but the results of the few examinations made indicate that there are few places, if any, along the entire Atlantic Coast where oyster food is more plentiful than it was last summer in the upper part of the Patuxent River. The richness of the available food supply in the Patuxent is probably to be attributed to the presence of the large area of muddy bottoms in the river and to the organic materials brought down from the marl beds above. The mud and marl contains a considerable quantity of decaying organic material which induces a rapid multiplication and growth of the microscopic plants (oyster food) which live at and near the surface of the bottom.

The area of bottom in the section of the river belonging to Calvert County which after examination was found not sufficiently productive of oysters to be charted and buoyed as natural oyster bar, aggregates 2,583 acres. Adjoining these exhausted bottoms is an almost equal quantity of barren bottom which is well adapted to the needs of oyster culture. The bottoms available for lease for oyster culture are well distributed along the entire shore of the river, as may be noted by reference to Charts Nos. 19 and 20, and every one residing along the river who desires to lease bottoms for oyster culture will have an opportunity to secure them.

CHESAPEAKE BAY.

(Shown on Charts of Natural Oyster Bars, Nos. 16, 17, 18 and 19.)

The natural oyster bars[1] found in this section are fifteen in number and aggregate an area of 8,834 acres. They were formerly much greater in extent and productiveness than now, but on account of the excellent quality of the oysters produced the bars have been dredged with unusual thoroughness with the result that very considerable parts of them are now so barren of both oysters and shells that it would probably require a period of time as long as that during which the bars were originally developed for them to be restocked by nature.

The area of depleted bottom which has been opened for leasing as a result of the survey covers about 5,089 acres. In addition to this there are about 4,000 acres of barren bot-

[1] See table on page 43.

toms adjacent to the depleted areas and natural bars, which are nearly as well adapted for oyster culture as the depleted areas.

Nearly all of the bottoms thrown open for lease for oyster culture are so situated as to make it possible to protect them from shore.

The kind of bottom which predominates over the greater part of the section occupied by the belt of natural oyster bars is considered ideal for growing oysters. It is composed of a mixture of sand and black or blue mud in proportions such as to be sticky. It is firm enough to support shells and oysters at its surface but can not be shifted by storms. It contains organic material, derived from deposits of sediment, in abundance, and therefore produces at its surface a rich growth of the microscopic plants which constitute the food of oysters.

In a few places areas of mud too soft to support oysters are found and in others pure sand forms the bottom. Examinations of the bottom along a line drawn from almost any point on shore to deep water would show a gradual change from pure hard sand to very soft oozy mud, the proportion of mud with the sand increasing directly with the distance from shore.

On the natural bars which have not been exhausted through over fishing, oysters begin to be found at depths of 3 to 6 feet and continue to be found until depths of about 35 feet are reached. The width of the oyster producing belt varies considerably but averages about .75 mile. In the vicinity of Plum Point the width of the natural bar is more than one mile. The factor which prevents the spread of the natural bars to deep water is not to be found in the depth of the water, however, but rather in the character of the bottom. The deposit of organic silt upon the bottoms of the Bay covered with water deeper than 35 feet seems to be sufficient in quantity in most localities to render the bottom too soft to support oysters. That the pressure of the water in depths greater than 35 feet has no harmful effect upon oysters is proved by the fact that oysters thrive in the Patuxent River near Point Judith where the depth of water reaches 130 feet. Oyster planting has been successfully carried on in Rhode Island and New York on bottoms covered by water from 60 to 80 feet.

Observations on the rise and fall of the tide were carried on at Drum Point Lighthouse (situated at the extreme southern end of the section), from June 1 to August 22, 1908. The mean range of the tide during this period was found to be 2.5 feet; the maximum range, 3.4 feet.

The water flows over the deeper parts of the oyster bars along the Calvert County shore at velocities of from .3 to .7 mile per hour. The rate of flow diminishes as the shallower water in shore is reached except in the immediate vicinity of points of land.

The table which follows gives the maximum and minimum densities of the water observed during the survey of the natural bars of the section. It will be observed that there is a very perceptible decrease in the density as the distance from the mouth of the Bay increases and also that the density gradually increased during the summer. Probably the minimum density attained during the spring over the upper part of the section is about 1.003 and the maximum during the fall about 1.012.

Name of Oyster Bar.	*Date.*	*Densities.*
Chinese Muds	June 10	1.005 to 1.0102
Flag Pond	June 22	1.0032 to 1.0048
" "	July 1	1.005 to 1.0062
Plum Point	July 7	1.004 to 1.0056
" "	Sept. 25	1.010
Hog Island	July 15	1.0033 to 1.005
" "	Sept. 25	1.009

In no part of the Chesapeake can natural conditions more favorable for oyster culture be found than prevail in this section, and it is believed by the Commission that were the restrictions removed which now hinder the development of oyster culture, much of the barren bottom in this section of the Bay would be leased and cultivated.

NATURAL OYSTER BARS OF CALVERT COUNTY.

Number of Bar.	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters Per Sq. Yd. as Calculated From Records of Examination		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1908-1909.	Season of 1909-1910.	Season of 1908-1909.	Season of 1909-1910.
		Patuxent River										
1	Old Lump	June 1 and 2, 1908.	15	14	3	2	.92	1.15	16.9	12.3	236	172
2	Carroll Muds	June 12, July 7, 13 '08	24	*—	4	2	.68	1.96	28.8	14.5	691	348
3	Light House Lump	July 8, 1908.	35	45	4	4	3.81	2.59	38.0	40.5	2052	2187
4	Southeast Middleground	July 8, 13, 28, 29, 30, '08	281	200	11	11	3.02	3 83	56.3	40.8	11260	8160
5	Swash	July 8, 28, and 29, '08	16	232	7	7	8 28	5.10	75 0	85.8	1200	1373
6	Cherrytree	July 13, 29 and 30, '08	22	80	6	5	1.21	2.37	34.8	20.6	7656	4532
7	Shellpile	July 30, 1908	5	10	4	4	3.07	2.88	42.3	36.0	211	180
8	Sandy Point Lumps	July 10, 13 & 30, 1908	74	146	4	3	3.62	2.58	37.9	39 2	2804	2900
9	Back of Island	July 9 & 13, 1908	97	39	6	6	8.22	5.54	81.4	87.5	3174	3412
10	Barngates	July 9 & 22, 1908	173	175	9	7	5.90	11.12	163.5	97.8	28285	16919
11	Hungerford Hollow	July 22 & Aug. 7, '08	65	138	4	4	1.27	3.78	55.5	27.8	3607	1807
12	Hellen	July 24, Aug. 5, 13, '08	226	341	9	8	1.99	3.52	51.7	31.7	11684	7164
13	Mears	July 23, 24, Aug. 13 '08	251	**485	6	4	4.59	4.79	70.4	57.0	17670	14307
14	Peterson	July 23, Aug. 12, 13, '08	420	**772	5	3	1.18	3.64	53.5	26 4	22470	11088
15	Island Creek	Aug 12, 14, 20, Sept. 1	32	629	4	4	——	2.15	31.6	10.5	1011	336
16	Broome Island	Aug. 14, 20, Sept. 1	171	297	5	3	.74	3.50	51.4	22 5	8789	3847
17	Parkers Wharf	Aug. 19 and 20, 1908	188	416	4	2	.68	3.32	48.8	21.3	9174	4004
18	Jacks Bay	Aug 19, 21, 25, Sp. 1 '08	333	629	4	4	.41	3 42	50 3	19.8	16749	6593
19	Jacks Marsh	Aug. 20, 21 and 25, '08	124	226	4	2	1 02	2.76	40.5	21.0	5022	2604
20	Prison Point	Aug. 21 and 24, 1908	344	499	4	2	.36	2.11	31.0	12.9	10664	4438
21	Kitts Marsh	Aug. 21, 22 and 24, '08	245	235	4	2	.17	3.76	55.3	19.5	12995	4582
22	Thomas	Aug. 21, 22, Sp. 2, '08	40	***—	3	2	.23	2.39	35.1	12.7	1404	508
23	Broad Neck	Aug. 22, 24, Sp. 2, '03	54	61	4	2	.74	4.03	59.3	25.1	3202	1355

*Included with area of bar of same name in Chesapeake Bay.
**Includes area of bar of same name in St. Mary's County.
***Included with area of bar of same name in St. Mary's County.

NATURAL OYSTER BARS OF CALVERT COUNTY.

Number of bar	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters per Sq. Yd. as Calculated from Records of Examinations		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1907-1908	Season of 1908-1909	Season of 1907-1908.	Season of 1908-1909.
24	Macks Hollow	Aug. 24, 1908.	15	162.	4	4	——	3.07	45.1	15.0	676	225
25	Buzzard Island	Aug. 24, 1908.	120	120.	4	4	1.74	3.45	50.7	29.7	6084	3,564
26	Holland Point	Sept. 2, 1908.	84	131.	4	4	.97	1.59	23.4	14 8	1965	1,243
27	Spout	Sept. 2, 1908.	15	15.	4	3	1.66	1.75	25.7	20.7	385	310
		Total	3469	6082								
		Chesapeake Bay										
28	Hog Point	July 15, Sept. 25, '08.	323	1048.	4	4	1.05	1.12	16.4	13.1	5297	4231
29	Upper Steps	July 14, 15, Sp. 25, '08	271	2163.	4	4	.29	3.38	49.7	18.5	13469	5,013
30	Lower Steps	July 14, 17, Sp. 25, '08	685	894.	5	4	.48	1.07	15.7	5.8	10754	6,028
31	Plum Point	July 2, 7, 14, 17.	2516	2487.	6	5	.42	1.89	27.8	12.3	69138	30,590
32	Daddy Dare	July 7.	619	570.	5	4	1.10	3.21	47.2	23.8	26904	13,566
33	Governors Run	June 24, 30, July 1.	528	584.	6	6	.41	1.58	23.2	10.4	12249	5491
34	Emanuel	June 24 and 30.	1116	989.	5	5	.65	1.36	20.0	11.3	19780	11176
35	Flag Pond	June 23, 30, July 1, 5.	680	1290.	10	10	11.15	8.50	125.0	123.5	85000	83,980
36	Cove Point Bight	June 3.	218	218.	4	4	4.14	4.53	66.6	52 6	14519	11.467
37	Little Cove Point	June 2, 3 and 13.	215	333.	4	2	.60	.39	5.7	6.3	1225	1,354
38	Parker-Moore	June 2, '08.	218	324.	4	3	.99	1.02	15.0	12 2	3270	2,659
39	Under the Cliffs	June 2, '08.	40	32.	4	4	3.52	1.88	27.6	34 9	883	1,117
40	Simmons	June 2, '08.	27	265.	4	4	2.23	1.45	21.3	23.4	575	632
41	Chinese Muds	June 2, 9, 10 & 13, '08	1348	1760.	6	2	7.70	4.83	71.0	79.6	95,708	107,401
42	Carroll Mudds*	June 12, July 7, 13, '08	30	63.	4	2	.68	1.96	28.8	14.5	864	435
		Total	8,834	13,020								

*Part of this bar in St. Marys County waters.

CHARLES COUNTY.

The oyster-producing waters of Charles County include: first, the section of the Patuxent River from the middle of the mouth of Indian Creek to the middle of the mouth of Swansons Creek, west of the main river channel; second, the half of Wicomico River west of its deep water-channel.

Tongmen only are permitted by law to work on the natural oyster grounds situated in these waters.

The status of the oyster grounds which were surveyed was calculated from the results of the examinations in accordance with the rule or table printed on page 14. In the application of this table the oysters taken from the grounds in the Patuxent River were considered to have a value of one dollar per bushel; those grown in the Wicomico River, sixty cents per bushel.

Fifteen oyster lots covering a total area of 58 65-100 acres, leased under former law for the purposes of oyster culture and retained by the lessees under the Haman Oyster Culture Law, were re-surveyed by the engineers of the Commission during the period occupied by the survey of the natural oyster grounds.

PATUXENT RIVER.

(Shown on Chart of Natural Oyster Bars, No. 19.)

The part of the Patuxent River lying within the limits of Charles County, although little more than two miles in length, contains; 107 acres of natural oyster bar, charted and buoyed as three bars,[1] and some of the best bottoms for oyster planting purposes in the State.

The bottoms upon which the greater part of *Teague* and *Carpenters Yard* bars have been formed are composed of sand from the sand reefs which extend from shore to these bars. The oyster bar locally known as *Elbow* is located upon sticky mud such as is found in the greater part of the cove between Teague Point (Point Judith on charts) and Town Point.

All of the bars extend to the river channel, but over *Carpenters Yard* bar only is deep water found. In the part of the channel flowing through this bar depths of 35 to 45 feet

[1] See table on page 48.

were noted. The water over *Teague* and *Elbow* bars is shallow, the greatest depth over the former being 12 feet, over the latter, 9 feet.

On the date of the survey of these oyster grounds, September 2nd, the water over the lower part of *Carpenters Yard* showed a density of 1.0046 to 1.0056, and 1.0028 to 1.0036 over the upper part of *Teague* bar.

In the narrow part of the river between Benedict and Hallowing Point very swift currents are developed at certain stages of the tide, a velocity of 1.3 mile per hour having been measured over *Carpenters Yard* bar.

The unusually rich oyster food supply found to exist in the water in this part of the river which gives to the bottoms a special value for fattening oysters, is probably to be attributed to the fertilizing materials brought down from the extensive marl beds at the head of the river. The effect of such fertilizer in the water upon the growth of diatoms (the plants upon which oysters feed) is the same as that upon other plants.

Practically all of the bottoms outside the limits of the natural oyster bars are valuable for oyster culture. Those in the vicinity of *Elbow* bar are too soft to support oysters but they can be made sufficiently hard by first planting shells. The growth of oysters on the bottoms above Benedict is slow, due to the low density (freshness) of the water during parts of the year, but the food supply is such that oysters fatten rapidly.

WICOMICO RIVER.

(Shown on Chart of Natural Oyster Bars, No. 26.)

The section of the Wicomico River which contains natural oyster ground is about nine miles in length, reaching from the mouth of the river to a short distance above Stoddards Point.

For the purposes of carrying out the provisions of the Haman Oyster Culture Law the line marking the mouth of the Wicomico has been established by the Shell Fish Commission as shown on Chart of Natural Oyster Bars, No. 26, to begin at Cobb Point; thence along Cobb Point bar to its extreme end, as marked by Cobb Point Light; thence to the nearest point on St. Catherine Island. This interpretation

of the limits of Wicomico River is in accord with the rule generally observed in such cases which may be stated as follows: the mouth of a river is limited by a line connecting headland on one side with headland on the other; islands being considered to be part of the adjacent mainland.

The part of the river belonging to Charles County is almost filled with natural oyster bars, three barren and depleted areas only having been found; one between *Stoddard* and *Wicomico Lumps* bars, near the upper part of the river; one between *Wicomico Middleground* and *Charleston Creek* bars, just below the mouth of Charleston Creek; the other between *Shipping Point* and *Cobb Point* bars, near the mouth of the river.

The oyster bars begin near shore and extend to the middle of the main channel of the river, passing without a break into the bars on the opposite (St. Marys County) side and also without a break, except at the points mentioned above, into the adjacent bars above and below.[1] The depths of water over the bars vary from 4 to 9 feet at their inshore boundaries, and from 6 to 40 feet at their mid-channel boundaries.

The bottoms on which oysters grow in the part of the river above Rock Point are composed almost exclusively of mud, the oysters being found in lumps or hills which vary in area from a few square feet to several acres. The lumps increase in thickness, through the gradual accumulation of shells, and in area, by the spread or overflow of shells and oysters into the deep soft mud at their edges. By this process neighboring lumps have in many places grown together to form continuous bars. This process of nature of stocking the waste muddy bottoms with oysters is a very slow one but if large quantities of shells should be deposited in imitation of the natural process the formation of bottoms having the hardness required to support oysters would be rapidly effected.

Hard sandy bottoms are found in the part of the river opposite Mills Point; off Windmill Point and along the shore below Rock Point.

---

[1] The total area covered by the 12 natural oyster bars, which have been charted, is 2,254 acres. (See table, page 48.)

The density of the water observed during the month of November over the oyster bars is as follows:

Stoddard	1.008 to 1.0086
Wicomico Lumps	1.0084 to 1.0096
Joes Lump	1.0084 to 1.0097
Windmill	1.0098 to 1.0102
Fenwick	1.0098 to 1.0104
Charleston Creek	1.0098 to 1.0102
Lancaster	1.010 to 1.011
Cobb Point	1.0104 to 1.011

The records kept at Cobb Point Bar Light of the rise and fall of the tide from November 10th to 23rd show the mean range at the mouth of the river during this period to have been 1.9 feet; the maximum range, 3.5 feet.

The area of bottom in the part of the river belonging to Charles County which is adapted to oyster culture and available for lease for that purpose, aggregates about 400 acres. This includes the depleted bottoms in the localities mentioned above and those between the shore and the limits of the natural bars.

Neales Sound is a body of water which may be said to be tributary to the Wicomico River but is less than one hundred yards in width at its mouth and is hence not under the jurisdiction of the Haman Oyster Culture Law.

NATURAL OYSTER BARS OF CHARLES COUNTY.

Number of Bar.	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters Per Sq. Yd. as Calculated From Records of Examination		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1908-1909.	Season of 1909-1910.	Season of 1908-1909.	Season of 1909-1910.
		Patuxent River.										
1	Teague	Sept. 2, 1908.	48	40	4	4	5.42	2.12	31 2	50.2	1,248	2,008
2	Elbow	Sept. 2, 1908.	14	11	4	4	4.19	2.27	33.3	41.7	366	459
3	Carpenters Yard	Sept. 2, 1908.	45	58	6	6	.41	2 29	33.7	14.1	539	225
		Total	107	109								
		Wicomico River.										
4	Stoddard	Nov. 21, 1908.	34	28	4	4	2.24	3.31	48.5	32.3	1,358	904
5	Wicomico Lumps	Nov. 20 & 21, 1908	214	324	5	3	3.45	4.71	69.1	48.5	14,787	10,379
6	Mills West*	Nov. 20, 1908.	124	138	4	2	8.24	2.38	35.3	72.1	4,377	8,940
7	Joes Lumps	Nov. 20, 1908.	385	360	6	4	3.98	5.01	73.5	53.7	28,297	20,674
8	Windmill	Nov. 18 & 20, 1908.	306	341	7	5	9.35	4 93	72 8	92.7	22,277	28,366
9	Fenwick	Nov. 18, 1908.	152	149	4	2	.98	2.26	33.1	18.4	5,131	2,797
10	Wicomico Middleground	Nov. 17 & 18, 1908.	238	186	5	3	5 90	8.76	128.7	86.0	30,630	20,468
11	Charleston Creek	Nov. 17, 1908.	142	202	4	1	3 83	8.94	131.6	72.0	18,687	1.022
12	Lancaster	Nov 16 & 17, 1908.	185	183	5	3	30.26	13.54	190.5	289.0	36,870	53,465
13	Rock Point	Nov. 16 & 19, 1908.	258	228	10	10	5.05	3.54	52.2	54 4	11.901	12,403
14	Shipping Point	Nov. 16 & 18, 1908.	94	97	6	6	20.85	13.43	197.8	219.2	18,573	20,605
15	Cobb Point	Nov. 16 & 18, 1908.	122	269	5	4	1.85	.96	13.9	18.4	1,696	2,245
		Total	2254	2405								

*One examination only.

Sand Light House.

ST. MARYS COUNTY.

The waters of St. Marys County in which oysters grow, include a part of those of the Patuxent River, the section of the Chesapeake Bay between the mouths of the Patuxent and Potomac rivers, and the following tributaries of the Potomac: Smith Creek, St. Marys River, St. Georges River, Bretons Bay, St. Clements Bay, St. Catherine Sound and the part of Wicomico River east of its deep-water channel.

Dredging on the oyster bars located in the waters of the Potomac River is permitted to residents of both Maryland and Virginia but the bars in the tributaries of the Potomac from the Maryland side have been designated for the exclusive use of tongmen residing in Maryland. On this account differences of opinion between dredgers and tongmen have arisen as to the location of the lines marking the places where the waters of the tributaries end and those of the Potomac begin, and in order that the survey of the oyster grounds might be completed without delay and that charts might be constructed to show the natural oyster bars and all of the bottoms over which the State of Maryland has exclusive jurisdiction under the Haman Oyster Culture Law, it became necessary for the Commission to establish definite boundary lines in each of these cases. The description of these lines are given in the text relating to the respective tributaries.

Tonging only may be carried on in the Patuxent River but dredgers may work on all of the bottoms in the section of the Bay off St. Marys County.

In the work of determining the status of the surveyed bottoms, oysters grown in the part of Patuxent River above Point Patience were considered to have a value of one dollar per bushel; those below Point Patience and in the Bay, seventy-five cents per bushel and those grown in the tributaries of the Potomac, sixty cents per bushel. The tables used in finding the results of the examinations are reproduced on page 14.

The number of lots leased for oyster culture under former law and retained by the lessees under the Haman Oyster Culture Law, is 35, covering a total area of 124 31-75 acres. All of these lots were resurveyed and charted by the Commission during the survey of the public oyster grounds.

PATUXENT RIVER.

(Shown on Charts of Natural Oyster Bars, Nos. 19 and 20.)

The natural oyster bars which lie below the mid-river channel in the part of the Patuxent River included between the line in Indian Creek, marking the boundary between Charles and St. Marys counties, and the mouth of the river, are described in this report as located within the limits of St. Marys County, and the charts showing the location of these bars and the bottoms to be opened for lease for oyster culture will, when published by the Coast and Geodetic Survey, be filed in the office of the Clerk of Court in Leonardtown.

These oyster bars are 22 in number and cover a total area of 2,418 acres.[1] In the part of the river above Point Patience the oyster grounds on the St. Mary's side of the channel were found to be much more depleted than those on the opposite side, a condition which indicates that storms have had much to do with the final destruction of the oyster bars, especially such bars as may be in a depleted condition from having been overworked. The St. Marys shore of the Patuxent is subject to the violence of much more stormy weather than the Calvert County shore.

The conditions which affect the growth of oysters in the Patuxent, other than that referred to above, are practically the same on both sides of the river and need not be described a second time. A brief description of the conditions found to prevail during the period occupied by the survey is given in the part of this report devoted to the Patuxent on pages 36-39.

The quantity of ground which was surveyed but which the examinations showed to be practically barren, amounts to about 2,000 acres. This depleted area and not less than an equal amount of the adjacent barren bottoms is valuable for oyster culture.

SMITHS CREEK.

(Shown on Chart of Natural Oyster Bars, No. 24.)

A line drawn from Gray Point to Kitts Point is considered by the Commission to divide the waters of Smiths Creek from those of the Potomac River.

[1] See table on pages 60 and 61.

Above this line 571 acres of oyster ground was surveyed and examined, 393 acres of which has been charted and buoyed as five natural oyster bars.[1]

Two of these bars are found in Smiths Creek proper; two in the waters of its western or main branch and one in its eastern branch. The two large bars in the lower part of the creek extend from one shore to the other and cover the soft muddy bottoms of the channel as well as the hard bottoms on either side. The bars in the branches are confined to the hard bottoms in the shallow water between the channel and the shore.

Oysters grow even to low water mark on the coarse sand, gravel and shell fragments which are found along a considerable portion of the shore in this locality and it seemed necessary in the cases of *Jutland, Graves* and a part of *Smiths Creek* bars to make the inshore boundaries coincide with the shore line.

The maximum range of the tide at Miller's Wharf from September 10th to September 18th was 1.7 feet; the mean range, 1.1 feet. Should observations have been continued over a longer period, the tide would probably have been found to have a range more nearly equal to that at Point Lookout Light, where the maximum range from September 14th to October 6th was found to be 2.8 feet; the mean range, 1.3 feet.

The specimens of water collected from the oyster grounds near the mouth of the creek during the period occupied by the survey—September 10th to October 7th—showed a density of 1.0058-1.0082; those collected from the bars nearest the headwaters, 1.005-1.0078.

The bottoms once productive of oysters but now so depleted as not to be classed as natural oyster bar, are located between *Old Hare* and *Smiths Creek* bars and east of *Old Hare* bar. The barren bottoms of the section, suitable for oyster culture, cover about 50 acres and are located in the eastern branch of the creek. Some of the barren bottoms in Calvert Bay are also valuable, but the sand of which they are mainly composed, is liable to be shifted during storms unless well covered with shells.

---

[1] See table on page 61.

ST. MARYS RIVER.

(Shown on Chart of Natural Oyster Bars, No. 24.)

The waters of St. Marys River are considered by the Commission to enter the Potomac along the line connecting Kitts Point with the southern end of the small island lying to the east of St. George Island.

Oysters grow as far up the river as Martin Point, situated about eight miles above the mouth, but they are confined to the comparatively narrow shelves of hard sandy and gravelly bottoms which extend along both shores.

The water covering these shelves of hard bottom is shallow, depths exceeding ten feet having been found in but few places, but beyond them it deepens abruptly to about twenty feet. The bottoms covered by the deep water between the shelves is, as a rule, very soft and in but two comparatively small areas was it found to be sufficiently well stocked with oysters to be considered natural oyster bar.

St. Marys River receives one tributary from the east, St. Inigoes Creek, and two from the west, Carthagina Creek and St. George River. The last, on account of its peculiar location and character has been made the subject of a separate section. No oyster grounds were designated by the local assistant for survey in Carthagina Creek. In St. Inigoes Creek and St. Marys River proper, however, the grounds which were surveyed and shown by examination to be well stocked with oysters aggregate an area of 1,589 acres.

Along a considerable portion of the shores of this entire section oysters become attached and grow in abundance to low water mark and, in order that these oyster-producing bottoms should all be included within the limits of natural bars, it was necessary to use the shore line as all or part of the inshore boundary to twenty of the twenty-six natural bars which have been charted and buoyed.[1]

From September 10th to October 27th, the period during which the survey of the oyster grounds in St. Marys River was carried on, the water increased in density about .002. Samples taken from the oyster bars near the mouth of the river during the entire period showed a density of 1.006-1.009; from the head of St. Inigoes Creek, 1.006-1.010; from the head of the river, 1.0054-1.0098.

[1] See table on pages 61 and 62.

The barren and depleted bottoms which will be opened for lease and which are adapted to oyster culture aggregate about 1,500 acres. A small part of it is located between the natural bars near the mouth of the river and in St. Inigoes Creek but the greater part is found above the mouth of St. Inigoes Creek.

ST. GEORGE RIVER.

(Shown on Chart of Natural Oyster Bars, No. 24.)

St. George River is connected directly with the Potomac through the Straits at the upper end of St. Inigoes Island and almost as directly, through the mouth of the St. Marys River. The section between the mainland and St. George Island is in reality a Sound and, because of its double connection with the Potomac, is exceptionally well adapted to the growth of oysters. Almost all of the bottoms of the river, including the soft mud of the channel as well as the sandy bottoms near shore, are well stocked with oysters and have been included within the limits of thirteen natural bars.[1] Of the 1,250 acres of oyster ground pointed out by the local representative for survey and examination, 187 acres only were found to have been depleted bottom. In addition to this depleted area there is about an equal amount of barren bottom in the river adapted to oyster culture which will be available for lease. About 50 acres of this is situated in Price Cove; an equal amount between the shore line and the inshore limits of *Milbourne Shore* bar; the remainder in the upper part of the river.

The density of the water fluctuates with the rise and fall of the tide but the circulation is such that there is no appreciable difference in the density at the head of the river and at its mouth. The specimens taken when the tide was low from October 19th to 22nd, showed a density of about 1.0096; at high tide, 1.0104.

HERON ISLAND SOUND.

(Shown on Chart of Natural Oyster Bars, No. 25.)

Heron Island Sound is the name given by the Commission to the waters lying below the mouths of Bretons and St.

[1] See table on page 63.

Clement bays and included between Heron and Blackistone Islands and the adjacent mainland. The boundary line between the Sound and the Potomac River, as established by the Commission for the purposes of delineating the oyster bars and showing the barren bottoms over which the State of Maryland has exclusive jurisdiction under the Haman Oyster Culture Law, is as follows: Beginning at Higgins Point and running in a straight line to C. & G. S. triangulation station "Heron"; following the shore line from said triangulation station to the most westerly point on Heron Island; then in a straight line to the most easterly point on Blackistone Island; following the shore line to the most westerly point on Blackistone Island; and then in a straight line to Colton Point on the mainland.

The total area covered by the Sound as thus defined is nearly 1,900 acres, and of this area 1,102 acres have been included within the boundaries of six natural oyster bars.[1]

The survey of the oyster grounds in the Sound was carried on during the oystering season and all the bottoms over which tongmen were observed by the engineers to work, were conceded to be natural oyster bar without examination, the positions of the boats in which the tongmen were at work being located by the engineers and plotted as examination stations on the boat sheets.

On December 9th and 10th the water in the Sound had a density of 1.0126-1.0138.

The observations made on the tide at Colton's Wharf from December 9th to 15th showed a maximum range for this period of 2.0 feet and a mean range of 1.8 feet.

The bottoms not included within the limits of natural bars aggregates an area of 776 acres but the greater part of it is located in the channels in deep water where the bottom is composed of very soft mud and is therefore not valuable for oyster culture without considerable preparation. A small area of barren bottom situated just below Newtown Neck is adapted for growing oysters.

BRETONS BAY.

(Shown on Chart of Natural Oyster Bars, No. 25.)

Bretons Bay is not different in its physical features from the *rivers* which are tributary to the Chesapeake and

[1] See table on page 63.

Potomac. At its mouth and for more than half its course, it has a width of one mile and it is seven miles in length.

A straight line connecting Higgins Point with C. & G. S. triangulation station "Kaywood" on Kaywood Point, is considered by the Commission to separate the waters of Bretons Bay from those of Heron Island Sound.

The oyster-producing part of the Bay extends to within two miles of its headwaters and covers a total area of 1,600 acres. In this section nine natural oyster bars, covering 924 acres, have been charted and buoyed. (See table on page 64.) On seven of these bars oysters were found to grow to low water mark and in these cases the shore line was used to limit the inshore boundaries. The inshore limits of the two remaining bars were found to be near the six-foot curve.

The bottoms are composed almost exclusively of very soft mud, those made up of hard sand or sticky mud being confined to very narrow strips along parts of the shore. The substratum of the oyster bars is as soft as the barren bottoms beyond and, as is usual in such cases, the oysters grow in lumps.

From December 8-11 the observed density of the water over the bars near the mouth of the Bay was 1.011-1.0134; near the head of the Bay, 1.0098-1.011.

The barren and depleted bottoms which occur along the shore are valuable for oyster culture. Such bottoms aggregate about 250 acres.

ST. CLEMENT BAY.

(Shown on Chart of Natural Oyster Bars, No. 25.)

The waters of St. Clement Bay are separated from those of Heron Island Sound by a straight line, one and one-quarter miles in length, connecting C. & G. S. triangulation station "St. Clement" situated on the southwestern extremity of Newtown Neck, with the point just below the mouth of Patrick's Creek on the opposite shore. The distance from this line to the head of the bay is about six miles.

The section of the bay which produces oysters extends to within one mile of the head of the bay and has a total area of a trifle more than 2,000 acres. The productive oyster ground which was found to cover 1,225 acres has been charted and buoyed as ten natural oyster bars.[1]

[1] See table on page 64.

St. Clement Bay, in its physical and biological characters,—outline, area, depth of water, character of bottom, etc.,—is almost a duplicate of Bretons Bay, and the oyster bars occupy similar positions in each. The water flows swifter in St. Clement Bay than in Breton, due to the straighter course of the former and on this account oysters grow higher up in St. Clement than in Bretons Bay.

The observed density of the water over the bars near the mouth of the bay from December 9th to 14th was 1.0108-1.013; near the headwaters, 1.009-1.010.

On the narrow margin of hard bottom which skirts the shore, oysters of fine shape were found to be distributed continuously but on the soft mud which covers the greater portion of the bottoms, the oysters were found in lumps and were poor in shape.

About 200 acres of barren and depleted bottom well adapted to oyster culture is distributed at various points along both shores of the bay.

ST. CATHERINE SOUND.

(Shown on Chart of Natural Oyster Bars, No. 26.)

The boundary line between St. Catherine Sound and the Potomac and Wicomico rivers begins at the most southerly point on the mainland between Dukehart's and Hackley's creeks and extends in a straight line to the most southerly point of the sand bar which forms the southeastern end of St. Catherine Island; it then follows the shore line of St. Catherine Island to the end of the sand bar which forms its northwestern extremity; then runs in a straight line to the most southerly point on St. Margarets Island; then follows the shore line of St. Margarets Island to its most easterly point from which it runs in a straight line to the nearest point on the mainland.

All of the oyster grounds pointed out by the local assistant for survey were found upon examination to be well stocked with oysters and five natural bars covering a total area of 103 acres have been charted and buoyed.[1]

The water is everywhere shallow, no depth greater than ten feet having been noted during the survey. The bottoms

[1] See table on page 65.

are all hard and sandy with the exception of a small area of soft mud on and near *St. Catherine* oyster bar.

During the period when the survey was carried on, the water collected from the oyster grounds showed a density of 1.009 to 1.012. The Sound receives some fresh water from the small creeks which empty into it but during the greater part of the year its waters probably do not differ materially in density from those of the Potomac.

A maximum range in the tides of 3.5 feet was noted in this locality which is sufficient to bring about a good circulation of the water over the shallow bottoms of the Sound. The mean range of the tide is 1.9 feet.

Not less than 200 acres of the barren bottoms in this section are valuable for oyster culture.

WICOMICO RIVER.

(Shown on Chart of Natural Oyster Bars, No. 26.)

The conditions affecting the growth of oysters in the part of Wicomico River belonging to St. Marys County do not differ materially from those observed to prevail over the oyster grounds on the Charles County side and their description need not therefore be repeated. (See page 45-47.)

The fifteen natural oyster bars which almost fill the part of the river belonging to St. Mary's County have a total area of 2,567 acres. The name, extent and condition of each bar as ascertained during the survey is given in the table on page 65.

Barren and depleted bottoms having an area of about 500 acres, considered to be adapted for oyster culture, are to be found at several places between the inshore limits of the natural oyster bars and the shore line from St. Margarets Island to *Keys* bar above the mouth of Chaptico Bay.

CHESAPEAKE BAY.

(Shown on Charts of Natural Oyster Bars, Nos. 21, 22 and 23.)

The natural oyster bars in the part of the Bay adjacent to St. Marys County have been designated by law for the use of dredgers. A part of this area, however, is resorted to by tongmen who live along the Bay shore.

With the exception of a barren area about one and one-half miles in length in the vicinity of Point No Point, the entire twenty-two miles of shore line from the mouth of the Patuxent River to the mouth of the Potomac is paralleled by a belt of natural oyster bars having an average width of about one and one-half miles and aggregating a total area of 14,484 acres. For convenience in description this belt has been divided by lines perpendicular to the shore into twelve natural oyster bars.[1] The lines fixing the limits of the bars have been more or less arbitrarily located but some of the area included between the lines in each case is locally known by the names which have been given to the bar containing it as delineated on the charts.

The results of the examinations made during the survey of the section show that nearly all of the area claimed to be natural oyster bar by the local assistant is natural bar according to the standard adopted by the Commission. Depleted grounds, aggregating a total area of 3,500 acres, were found in the following places: between Hog Point and Cedar Point, in Cedar Point Hollow, northwest of *Tenacres* bar, between the bars known as *McKay* and *Fish Hawks Nest* and the shore line, between *Sharing Pile* bar and the shore line and between *Point Lookout* bar and the shore line. These depleted grounds afford good opportunities for oyster planting, and will be offered for lease.

The barrenness of an extensive area in the vicinity of Point No Point is due to the sandy character of the bottom and to its location in a place exposed to the unbroken violence of storms. Materials which might be deposited on this bottom either naturally or artificially to serve as cultch for the attachment of oyster spat are covered by the shifting sand before an oyster colony of sufficient size to hold the bottom together can be formed.

One of the peculiarities of the bars of this section is that their inshore limits are not found at the usual place,—at or near the six-foot depth curve,—but extend to, and in many cases, beyond low water mark. This is to be accounted for by the fact that gravelly and stony materials compose much of the beach and the bottoms near shore, in this section. These materials, kept clean by the action of the waves, offer most favorable surfaces for the attachment of spat.

---

[1] See table on page 66.

This stony material is not limited to the bottoms in shallow water but is abundant on much of the bottom far from shore. It was taken with the tongs at nearly half of the stations at which examinations were made on the off shore or deep water portion of the oyster grounds and it occurred as frequently in connection with soft muddy bottoms as with hard sand, an indication that it has been distributed over the bottom by the action of currents and waves from the shore and from the outcrops of stone beneath the Bay.

The off shore parts of the bars usually terminate in soft muddy bottoms, and patches of similar bottom, although more sticky and buoyant, are found here and there, especially on *Cedar Point Hollow, Shaving Pile* and *Butler* bars.

The maximum range of the tide at Point Lookout Lighthouse wharf, from September 14th to October 6th, was 2.8 feet; the mean range, 1.3 feet.

The maximum rate at which currents were observed to flow was:

.74 mile per hour over Chinese Muds bar;
.97 mile per hour over Cedar Point Hollow bar, and
.61 mile per hour over Lookout bar.

The maximum and minimum densities of the water observed during the period occupied by the survey are as follows:

Oyster Bar.	*Date.*	*Densities.*
Cedar Point Hollow	Sept. 22	1.0088—1.0106
Rocky Beach	" 22	1.009 —1.0104
Tenacres	" 22	1.0086—1.0098
McKay	" 21	1.0088—1.0104
Fish Hawks Nest	" 18	1.0082—1.0095
Shaving Pile	Oct. 5	1.0108
Butler	" 6	1.0104
Look-in	" 6	1.0105
Look-out	" 6	1.0095—1.0102

NATURAL OYSTER BARS OF ST. MARYS COUNTY.

Number of Bar.	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters Per Sq. Yd. as Calculated From Records of Examination		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1908-1909.	Season of 1909-1910.	Season of 1908-1909.	Season of 1909-1910.
		Patuxent River.										
1	Brooks Shallows	Sept. 2, 1908	9	40.	4	4	3.75	2.73	40.1	40.8	361	367
2	Sotheron	Aug. 24, 1908	16	21.	4	4	1.66	1.75	25.7	20.7	411	331
3	Broad Neck	Aug. 22, 24, Sept. 2, 1908	55	121.	4	2	.56	1.83	26.9	13.0	1,479	715
4	Thomas	Aug. 21, 22, 1908	121	287.	3	4	.32	2.17	31.9	12.9	3,860	1,564
5	Sandgates	Aug. 20, 21, Sept. 1, 1908	130	502.	6	6	....	2.16	31.7	10.5	4,121	1,365
6	Upper Forrest	Aug. 19, 1908	40		4	4	.33	2.03	29.8	12.2	1,192	488
7	Lower Forrest	Aug. 19, 1908	20	315.	4	4	.60	2.84	41.8	18.2	836	364
8	Peterson	Aug. 12, 1908	91	**	3	1	.33	2.53	37.2	14.7	3,385	1,338
9	Gatton	Aug. 14, Sept. 1, 1908	158	171.	5	5	3.08	4.72	69.4	45.7	10,965	7,220
10	Captain Point	Aug. 12, 1908	9	83.	4	4	2.84	1.52	22.3	28.2	201	254
11	Mears	July 24, 1908	57	**	3	1	5.83	7.12	104.7	82.5	5,968	4,702
12	Neale	July 23, Aug. 7, 1908	214	365.	4	4	1.94	2.64	38.8	27.2	8,303	5,821
13	Half Pone Point	July 24, Aug. 7, 1908	51	120.	4	4	.15	1.48	21.7	8.2	1,107	418
14	Hawks Nest	July 22, Aug. 7, 1908	325	403.	8	8	4.51	3.07	45.1	48.0	14,657	15,600
15	Bob Wise	July 29, 1908	38	57.	5	3	12.22	9.83	144.5	138.1	5,491	5,248
16	Spencers	July 9, 22, 1908	105	147.	4	2	6.08	7.92	116.4	83.5	12,222	8,767
17	Town Creek	July 8, 11, 1908	34	170.	4	4	4.10	4.14	60.8	50.4	2,067	1,714
18	Goodwin	July 8, 1908	7	89	4	4	3.92	1.38	20.4	35.5	143	248
19	La Grande	July 9, 11, 30, 1908	143	210.	5	5	4.74	3.84.	56.4	53.6	8,065	7,665
20	Millstone	July 10, 11, 1908	259	266.	4	2	4.56	4.90	72.0	57.5	18,648	14,892

** Area surveyed included in bars of same name in Calvert County.

Number of Bar.	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters Per Sq. Yd. as Calculated From Records of Examination		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1908-1909.	Season of 1909-1910.	Season of 1908-1909.	Season of 1909-1910.
21	Deep Point Mud	July 8, 10, 11, 13, 1908	228	227.	4	3	5.27	5.90	86.7	67.5	18,680	15,322
22	Carroll Muds	June 5, July 10, 13, 1908	220	*461	5	3	1.77	2.12	31.0	23.2	6,820	5,004
	Total		2330	3954								

* These figures include the total area surveyed.

Smiths Creek.

23	Old Hare	Sept. 10, 11, Oct. 7, 1908	140	276	4	4	7.89	2.19	32.3	68.4	4,522	9,576
24	Smiths Creek	Sept. 11, 15, Oct. 7, 1908	148	185	10	9	12.09	3.69	54.4	106.6	8,051	15,777
25	Dunbar	Sept. 15, Oct. 7, 1908	5	9	4	4	13.00	6.36	93.4	126.5	467	632
26	Jutland	Sept. 15, 16, 1908	50	48	6	5	19.87	2.71	39.7	159.6	1,905	7,660
27	Graves	Sept. 15, 16, 1908	50	52	5	4	9.15	1.91	27.9	76.5	1,495	3,825
	Total		393	571								

St. Marys River.

28	Sedge Point	Oct. 13, 1908	40	171	3	3	11.48	2.96	43.4	98.5	1,736	3,940
29	Chicken Cock	Sept. 11, Oct. 13, 26, 1908	140	221	5	5	5.72	2.71	39.7	55.1	5,558	7,714
30	Fort	Oct. 7, 13, 1908	92	128	4	4	4.55	1.99	29.4	43.4	2,705	3,393
31	Langleys Hollow	Oct. 8, 14, 1908	88	100	6	5	5.48	2.24	33.1	51.4	2,913	4,523
32	Priest	Oct. 8, 14, 1908	78	63	5	5	16.55	5.20	76.5	141.9	4,819	8,940
33	Raley Shore	Oct. 8, 14, 26, 1908	32	45	4	4	20.59	6.93	102.2	185.3	3,270	5,930

NATURAL OYSTER BARS OF ST. MARYS COUNTY.

Number of Bar.	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters Per Sq. Yd. as Calculated From Records of Examination		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1907-1908.	Season of 1908-1909.	Season of 1907-1908.	Season of 1908-1909.
34	Jones	Oct. 23, 1908	17	16.	4	4	22.66	5.28	77.9	186.7	1,246	2,987
35	St. Inigo South	Oct. 23, 1908	12	}	4	4	12.66	2.55	37.5	105.9	450	1,270
36	St. Inigo North	Oct. 23, 1908	15	42.	4	4	11.21	2.15	31.6	92.7	474	1,390
37	Kennedy	Oct. 26, 1908	15	15.	4	4	25.74	8.05	118.4	228.7	1,776	3,430
38	Rosecroft Hollow	Oct. 16, 1908	45	56.	7	6	14.15	5.68	83.8	131.6	3,771	5,922
39	Gravelly Run	Oct. 16, 26, 1908	85	75.	6	5	16.99	4.59	67.6	147.1	5,070	11,032
40	Seminary	Oct. 26, 1908	23		5	5	22.16	3.27	47.8	178.7	1,099	4,010
41	Horseshoe	Oct. 27, 1908	11		3	3	19.88	1.93	28.7	155.9	315	1,715
42	Bryan	Oct. 27, 1908	10		5	5	59.18	1.68	25.0	443.5	250	4,435
43	Short Point	Oct. 27, 1908	16	984.	5	5	31.01	2.49	36.7	240.5	587	3,848
44	Biscoe	Oct. 27, 1908	5		4	4	31.39	2.27	33.1	461.9	165	2,309
45	Pagan	Oct. 27, 1908	7		4	4	21.51	1.51	22.1	316.3	148	2,214
46	West St. Marys	Oct. 26, 1908	16		3	3	9.06	2.72	39.7	81.6	635	1,305
47	Cooper Creek	Oct. 17, 1908	23		5	3	11.51	7.63	112.5	107.4	2,587	2,570
48	Coppage	Oct. 17, 1908	45	52.	4	2	14.67	5.39	88.3	133.9	3,973	6,025
49	Thompson Creek	Oct. 8, 15, 1908	89	88.	6	5	14.80	5.01	73.5	133.1	6,468	11 713
50	Carthagina Creek	Oct. 8, 15, 1908	49	76.	4	3	14.23	4.36	64.0	126.7	3,136	6,208
51	Coad	Oct. 10, 15, 1908	123	128.	4	3	15.62	7.52	110.3	151.5	12,464	17,119
52	Edmond	Oct. 7, 10, 15, 1908	59	89.	4	3	14.97	4.94	72.8	134.6	4,295	7,941
53	Cherry	Oct. 7, 14, 19, 1908	264	332.	6	5	12.87	3.93	58.1	114.0	15,338	30,096
54	Middle Ground Lump	Oct. 7, 1908	10	155.	3	3	*					
55	Mouth of Creek	Sept. 10, Oct. 7, 15, 1908	180	236.	5	5	22.09	5.87	86.0	191.2	15,480	34,416
	Total		1589	3138								

* One examination only made on this ground.

NATURAL OYSTER BARS OF ST. MARYS COUNTY.

Number of Bar.	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters Per Sq. Yd. as Calculated From Records of Examination		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1908-1909.	Season of 1909-1910.	Season of 1908-1909.	Season of 1909-1910.
		St. Georges River.										
56	St. George	Oct. 19, 23, 1908	132	132.	5	3	5.19	2.96	43.4	52.2	5,729	6,890
57	Goose Point	Oct. 19, 21, 23, 1908	88	91	4	1	10.67	3.40	50.0	94.9	4,400	8,351
58	Milbourne Shore	Oct. 19, 20, 21, 1908	174	202	9	5	4.01	1.49	22.1	36.7	3,845	6,386
59	Tarkhill	Oct. 20, 21, 1908	113	134.	6	5	6.87	2.46	36.0	62.5	4,068	7,062
60	Cedar Point	Oct. 20, 21, 1908	36	38.	4	2	8.91	2.99	44.1	80.2	1,587	2,887
61	Sheban	Oct. 20, 21, 22, 1908	63	79.	9	4	5.04	1.97	28.7	47.1	1,808	2,967
62	Long	Oct. 22, 1908	23	58.	3	3	15.31	2.92	42.6	126.5	980	2,909
63	Chadwick	Oct. 22, 1908	18	67.	4	4	4.89	1.08	16.2	41.2	291	741
64	Rollin	Oct. 22, 1908	26	40.	4	2	9.90	1.85	27.2	81.6	707	2,121
65	Swan	Oct. 20, 22, 1908	50	48	4	3	14.55	6.88	101.5	140.5	4,872	6,744
66	Straits	Oct. 22, 1908	10	10	4	4	4.55	1.32	19.1	39.7	191	397
67	Island Shore	Oct. 19, 20, 22, 1908	154	174	5	4	7.43	2.72	39.7	67.6	6,114	10,410
68	Hurdle	Oct. 19, 1908	176	177.	5	3	11.23	4.13	61.0	89.7	10,736	15,787
	Total		1063	1250								
		Heron Island Sound.										
69	Heron Island Sound	Dec. 9, 1908	230	654.	3	3	*	*				
70	Heron Island Reef	Dec. 9, 1908	50	56.	4	3	*	*				
71	Dukehart Channel	Dec. 9, 1908	344	448.	5	5	6.52	2.71	39.7	61.0	13,657	20,984
72	Horse	Dec. 9, 12, 1908	300	306.	5	5	2.59	1.69	25.0	27.2	7,500	8,160
73	St. Clement Entrance	Dec. 9, 1908	120	244.	4	4	.05	1.11	16.2	5.9	1,944	708
74	Blue Sow	Dec. 9, 10, 15, 1908	58	170.	6	6	9.63	2.69	39.7	83.8	2,302	4,860
	Total		1102	1878								

* Few examinations made. Presence of longmen at work on these grounds taken as evidence that they are natural bars.

NATURAL OYSTER BARS OF ST. MARYS COUNTY.

Number of bar	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters per Sq. Yd. as Calculated from Records of Examinations		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1908-1909	Season of 1909-1910	Season of 1909-1910.	Season of 1910-1911.
		Breton Bay.										
75	Black Walnut	Dec. 10, 1908	254	388	7	7	13.77	9.89	145.6	149.3	36,982	37,922
76	Gough	Dec. 10, 1908	47	218	4	4	6.91	3.69	54.4	69.1	2,557	3,247
77	Lovers Point	Dec. 8, 1908	41	150	4	4	3.21	13.08	192.7	87.5	7,900	3,587
78	Mouldy Creek	Dec. 11, 1908	56	69	4	4	2.08	1.52	22.1	22.8	1,237	1,277
79	Island	Dec. 8, 11, 1908	33	43	5	5	13.74	7.87	115.46	139.7	3,808	4,610
80	Paw Paw Hollow	Dec. 8, 1908	52	82	5	5	22.14	10.54	155.2	214.7	7,970	11,164
81	Stony	Dec. 10, 1908	105	194	5	5	5.25	4.69	69.1	61.8	7,255	6,489
82	Railway	Dec. 10, 1908	240	334	5	5	11.88	10.84	159.6	140.5	38,304	33,720
83	Breton Bay	Dec. 10, 1908	96	128	5	5	1.15	5.46	80.2	35.3	7,695	3,389
	Total		924	1606								
		St. Clement Bay.										
84	Newtown Flats	Dec. 12, 1908	110	256	5	5	1.79	4.35	64.0	34.5	7,040	3,795
85	Chapel Point	Dec. 12, 14, 1908	310	374	4	4	4.65	4.89	72.1	58.1	22,351	18,011
86	Abell	Dec. 14, 1908	25	140	4	4	*	*	.....	.....	.....	.....
87	Reed Point	Dec. 14, 1908	198	388	7	7	12.63	14.45	212.5	163.3	42,075	32,333
88	Guest Marshes	Dec. 14, 1908	94	113	6	4	6.23	4.82	70.6	69.1	13,979	13,682
89	Harry Jacks	Dec. 14, 1908	124	128	6	3	1.86	3.52	51.4	30.9	6,373	3,831
90	Mileys Creek	Dec. 14, 1908	120	141	6	5	1.97	1.40	61.8	49.3	7,416	5,916
91	Bluff Woods	Dec. 12, 14, 1908	135	146	5	4	4.78	8.42	123.6	69.1	16,686	9,328
92	Canoe Creek	Dec. 12, 1908	74	168	6	6	8.32	16.38	240.5	141.2	17,797	10,449
93	Old Wreck	Dec. 12, 1908	35	154	3	3	Not Examined. Boats Working.					
	Total		1225	2008								

* One examination only. Presence of tongmen at work on this ground taken as evidence that it is a natural bar.

Number of bar	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters per Sq. Yd. as Calculated from Records of Examinations		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1908-1909	Season of 1909-1910.	Season of 1908-1909.	Season of 1909-1910.
		St. Catherine Sound.										
94	Waterloo	Nov. 19, 1908	29	21.	6	6	20.77	3.08	45.60	167.7	957.6	3,521.7
95	*Silver Spring	Nov. 19, 1908	16	12.	3	3	1.28	5.12	75.0	34.5	900.0	414.0
96	Hackley Creek	Nov. 19, 1908	19	11.	4	4	15.80	3.52	51.4	133.1	565.4	1,464.1
97	St. Catherine	Nov. 19, 1908	33	22.	4	4	8.10	2.27	33.1	70.6	728.2	1,553.2
98	Bullock Island	Nov. 19, 1908	6	8.	4	4	1.31	1.05	15.4	14.7	84.7	80.9
	Total		103	74								
		Wicomico River.										
99	Bullock	Nov. 16, 18, 19, 1908	204	192.	4	4	3.35	3.61	52.9	41.9	10,157.0	8,145.0
100	Mouth of River	Nov. 16, 19, 1908	108	98.	5	4	8.63	2.97	43.3	77.9	4,243.0	7,644.0
101	St. Margaret Island	Nov. 19, 1908	12	8.	4	4	10.12	1.32	19.1	80.9	152.8	647.2
102	Bluff Point	Nov. 16, 1908	659	680.	7	6	4.28	6.17	90.5	61.8	59,639.5	40,726.2
103	Blakistone	Nov. 21, 1908	26	24.	5	5	4.49	3.27	47.8	49.3	1,147.2	1,183.2
104	White Point	Nov. 17, 1908	194	220.	6	5	8.92	7.21	105.9	100.7	20,438.7	19,435.1
105	White Point Hollow	Nov. 17, 1908	18	15.	6	6	.98	2.26	33.1	18.4	496.5	276.0
106	Bramleigh Creek	Nov. 18, 1908	323	326.	6	4	2.84	4.87	71.3	44.9	22,958.6	14,457.8
107	Manahowick Creek	Nov. 20, 1908	184	182.	4	2	.90	.82	11.8	10.3	2,171.2	1,895.2
108	Russell	Nov. 20, 1908	325	373.	5	1	1.05	2.06	30.3	17.6	9,847.5	5,720.0
109	Mills East	Nov. 20, 1908	134	136.	5	1	4.44	1.38	20.6	39.7	2,754.4	5,319.8
110	Chaptico Lumps	Nov. 20, 21, 1908	137	143.	4	2	3.30	4.94	72.8	48.5	9,973.6	6,644.5
111	Cohonck	Nov. 21, 1908	128	149.	5	4	1.22	2.31	33.8	20.6	4,326.4	2,636.8
112	Key	Nov. 21, 1908	115	103.	5	5	3.51	4.50	66.2	47.8	6,818.6	4,923.4
	Total		2567	2649								

* One examination only.

NATURAL OYSTER BARS OF ST. MARYS COUNTY.

Number of Bar.	Name of Oyster Bar.	Date of Survey and Examination.	Area of Bar in Acres as Buoyed.	Area of Bar in Acres as Surveyed.	Number of Corners.	Number of Buoys.	Average Number Oysters Per Sq. Yd. as Calculated From Records of Examination		Estimate of Average Number Bushels Marketable Oysters per Acre.		Estimate of Total Number Bushels Marketable Oysters on Bar.	
							Culls.	Counts.	Season of 1908-1909.	Season of 1909-1910.	Season of 1908-1909.	Season of 1909-1910.
		Natural Bars Designated for Dredging. Chesapeake Bay.										
113	Chinese Muds	June 9, 10, 1908	984	1125.	5	3	11.51	2.63	38.6	97.3	37,982	85,743
114	*Carroll Muds	June 5, 10, 13, 1908	88	.....	5	3	1.85	1.84	27.1	22.5	2,385	1,980
115	Hog Island	June 5, 8, 9, 10, 12, 1908	486	919	4	3	1.41	.93	13.6	14.8	6,609	7,192
116	Cedar Point Hollow	Aug. 3, 11, Sept. 22, 1908	4850	5656.	10	10	2.98	2.77	40.7	35.1	197,395	170,235
117	Rocky Beach	Aug. 3, 4. Sept. 22, 1908	2127	2287	9	9	9.18	3.67	53.9	85.4	114,322	181,133
118	Tenacres	Aug. 4, Sept. 21, 23, 1908	682	1045.	4	3	5.03	1.75	25.7	45.4	17,527	30,963
119	McKay	Sept. 21, 22, 23, 1908	840	1024	9	7	4.73	1.64	24.1	42.7	20,244	35,868
120	Fish Hawk	Sept. 18, 21, 23, 1908	698	733.	4	3	4.54	1.83	26.9	42.3	18,776	29,525
121	Shavingpile	Oct. 1, 1908	94	286.	3	3	.83	.39	5.7	8.1	536	761
122	St. Jerome	Oct. 1, 1908	26	32.	4	4	8.27	2.59	38.1	73.4	991	1,908
123	Butler	Oct. 1, 5, 1908	523	617.	6	6	3.66	.59	8.6	29.7	4,498	15,533
124	Point Lookin	Oct. 1, 6, 1908	1772	2511.	8	8	2.80	.79	11.6	24.4	20,555	43,237
125	Point Lookout	Oct. 6, 1908	1314	1237.	7	7	3.00	.77	11.3	25.8	13,978	31,914
	Total		14484	17472								

* The greater part of "Carroll Muds" lies within the area designated for tonging operations in Patuxent River.

SKETCH ILLUSTRATING METHODS OF CONDUCTING THE SURVEY OF THE OYSTER GROUNDS OF MARYLAND

METHODS OF OYSTER SURVEY.[1]

INFORMATION FURNISHED.

Before beginning the actual survey of oyster grounds the Commission is furnished by the United States Coast and Geodetic Survey with projections, constructed on a scale of 1 part in 10,000 (approximately 6 1-3 inches to a statute mile), showing the shore line of the localities to be surveyed and the plotted positions of the triangulation stations. The Coast and Geodetic Survey has a party in the field to erect and determine such triangulation stations as are needed by the hydrographic engineers for use in making the survey of the oyster grounds.

Prior to making a survey of any section the local assistant, appointed by the County Commissioners, informs the hydrographic engineer of the approximate location and extent of the oyster grounds of the section so they can be indicated in pencil on the boat sheets. This information greatly expedites survey operations in that it makes surveys of barren bottoms unnecessary, and saves cost of erecting additional shore stations beyond the limits of the natural oyster bars.

EQUIPMENT.

The equipment for conducting the survey of the oyster grounds and crabbing bottoms consists in boats and instruments.

BOATS.

The launch "CANVASBACK,"[2] with a coxswain and machinist, is furnished by the United States Bureau of Fisheries. This launch, 42 feet long, 9-foot beam, has a draft of three feet and is hence well adapted for work on oyster grounds the boundaries of which extend into water as shallow as four feet.

The "ANGLE,"[2] a dead-rise bateau, 24 feet in length, belonging to the Commission, is used for surveying grounds situated in water too shallow for the advantageous use of the launch "CANVASBACK."

[1] Modified from former report in conformity with changes in methods.

[2] See illustration on opposite page.

The steamer "GOVERNOR R. M. McLANE," belonging to the State Fishery Force and placed at the disposal of the Commission in accordance with Section 97 of the Haman Oyster Culture Law, has been used for surveying oyster grounds situated in the bold waters of the Bay adjacent to Somerset, Calvert and St. Marys counties. This steamer has also been used in placing buoys at the corners of the natural oyster bars; towing the houseboat "OYSTER" from one anchorage to another and for transporting supplies (coal, water and provisions) to the houseboat.

The launch "INVESTIGATOR,"[1] a bay canoe, 34 feet long with 7.5-foot beam, purchased by the Commission and fitted with an eight horse power Fairbanks gasoline engine, has been used during the years 1907 and 1908 for making examinations of oyster grounds and for collecting data and specimens for the physical and biological investigations. During 1906 various boats were hired for this work, but the necessity for increasing the number of examinations of the grounds surveyed was later realized and a launch more perfectly adapted for the work was therefore fitted up.[2]

A scow, the "MARYLAND," 32 feet long, 12 feet wide and 3 feet deep, has been built and equipped by the Commission for use in transporting the buoys and sinkers and placing them at the corners of the natural oyster bars. The scow is towed from place to place either by the launches or by the steamer "GOVERNOR R. M. McLANE" and the sinkers and buoys are dropped from her deck.

The following description of the houseboat "OYSTER" is copied from the report prepared by Captain C. C. Yates and published by the United States Coast and Geodetic Survey:

HOUSEBOAT "OYSTER."[3]

While arranging to turn over the command of the steamer *Endeavor*, the representative of the Survey, acting under preliminary instructions from the Superintendent, was engaged in frequent consultation with the Shell Fish Commissioners in reference to the programme of future work. In addition to these duties, he undertook for the Commissioners the planning and supervision necessary to convert the old side-wheel steamer *Thomas L. Worthley* into a house boat for the

[1] See illustration opposite page 16.

[2] For a detailed account of the work and equipment of the Investigator, see pages 37 and 116 of First Report.

[3] See frontispiece.

surveying parties of both the Commission and the Government. The *Worthley*, now called the houseboat *Oyster*, was in excellent condition when purchased by the Commission. The keelsons and timbers were sound and the upper works strong. After the removal of the old engine and boiler, the houseboat was docked and her hull thoroughly examined. The outside planking below the water line was found in good condition, and although it was recalked, it was done as an additional precaution, the hull having been absolutely water-tight from the day of purchase.

The *Oyster* is about 135 feet over all and 35 feet in beam. The main deck contains living quarters for 27 men, the officers' mess-room and the galley. The upper deck has 11 staterooms, 5 for the 3 Commissioners and their 2 hydrographic engineers, 4 for the Coast Survey officers, 1 for the representative of the U. S. Bureau of Fisheries, and 1 for the local county oyster commissioner. Besides these rooms, there are located on this deck a large drafting room, a laboratory for oyster investigation, and an office room. Coal for the two Government launches and the galley is stored in the hold, which also contains fresh-water tanks having a capacity of about 7,000 gallons. Signal lumber is carried on the main deck aft of the officers' mess-room.

As a whole, the *Oyster* is plainly and practically equipped for the work to be done. She has added much to the amount of the surveying accomplished during the season, and the Coast and Geodetic Survey representative greatly appreciates the practical advantages furnished to his party by their quarters on the houseboat. When the large party of the combined surveying forces is taken into consideration with the limited accommodations usually obtainable on shore, the attending difficulties of a scattered party, the uncertain location and supply of coal and water for launches and sufficient lumber for signals, it is easily seen that the amount of work accomplished would have been reduced greatly, if there had been no such houseboat as the *Oyster* to supply all requirements of the surveying operations.

With reasonable care and repairs, the *Oyster* will be a valuable asset to the Commission at the completion of the oyster survey of the State, besides having paid her first cost several times over in both quality and quantity of work accomplished.

The steam launch "INSPECTOR" and coal-oil launch "BLAKE," although not used by the Commission or its engineers directly, are nevertheless a part of the equipment for the work of the survey. They belong to and are used by the Coast and Geodetic Survey party in erecting signals, placing monuments to mark the triangulation stations and for making the triangulation necessary to determine the geographical positions of the permanent objects and signals.

A number of small boats, furnished by the United States Coast and Geodetic Survey and Bureau of Fisheries, are available for any purpose for which they may be needed.

INSTRUMENTS.

The instruments (sextants, protractors and drawing instruments) and record books needed by the hydrographic engineers for conducting the survey of the oyster grounds have been loaned to the Commission by the United States Coast and Geodetic Survey.[1] The uses to which the instruments are put are described further on.

Such instruments as have been found necessary for constructing leasing charts, for computing areas and for conducting the physical and biological investigations [2] have been purchased by the Commission.

ORGANIZATION.

The organization of the party for hydrographic field work when fully completed is as follows:[3]

1 Hydrographic Engineer.
2 Asst. Hydrographic Engineers.
1 Draftsman.
1 Clerk (on houseboat).
1 Recorder.
1 Leadsman.
1 Local Assistant.
1 Expert Tongman.
2 Oarsmen.
1 Boatswain (houseboat).
1 Nightwatchman (houseboat).
1 Coxswain (Investigator).
1 Machinist (Investigator).
1 Tide Observer.
2 Cooks.
2 Waiters.

Day laborers for buoy construction and oarsmen have been hired as the exigencies of the work required.

METHODS.

The methods used by the Commission in making the hydrographic survey of the oyster grounds of Maryland, with slight modifications, are the same as those used by the United States

[1] Authorized by the Act of Congress approved May 26, 1906.

[2] The apparatus used in ascertaining the density of the water over the oyster grounds is the property of the U. S. Coast and Geodetic Survey.

[3] Changes having been made in the personnel of the party as the survey progressed from one section of the State to another, the names of employees are omitted.

Bureau of Fisheries in conducting surveys of oyster grounds in other States, and the Coast and Geodetic Survey in making a hydrographic survey.

The approximate position of an oyster ground having been pointed out by the local assistant, the Chief Engineer, with the survey party on the launch "CANVASBACK," runs a zigzag or parallel series of sounding lines over it (see figure 6), the object of which is to ascertain the exact limits of the ground, the depth of water over it and the condition of the bottom.

A copy of a polyconic projection, known as a boat sheet, showing the shore line of the region being surveyed, and the plotted positions of the signals erected on shore, is thumb-tacked to a chart board in front of the hydrographic engineers. By means of a three-arm protractor,[1] or position finder, the positions of the launch at the end of two- or three-minute intervals, while running the sounding lines, are plotted on this boat sheet by the chief engineer, the locations of the launch being ascertained by means of sets of angles taken simultaneously by the engineers observing on three shore signals with sextants.[2] By connecting consecutive positions, as they are plotted by straight lines the course of the lines of soundings is shown on the boat sheet.

The three-point problem, which is involved in locating each of the positions occupied during the survey, is illustrated by figure 7, in which X represents the launch and A, B and C the signals on shore. The angles AXB and BXC are those taken by the engineers with *sextants* to locate their position at X. The right-hand angle BXC (75° 48′) is transferred to the vernier between the middle arm and right arms of the *protractor* and the left-hand angle AXB (58° 16′) is transferred to the vernier between the middle and left arms. When the protractor is thus set and laid on the chart in such

[1] A three-arm protractor (figure 5) is an instrument used for plotting observations with sextants of two angles to three known points for the location of the point of the observer. The description of the theory of the sextant and protractor and their use in hydrography requires the use of language too technical to be of general interest.

[2] A sextant (figure 4) is an instrument constructed for measuring the angle between two objects (signals) from the position of the observer.

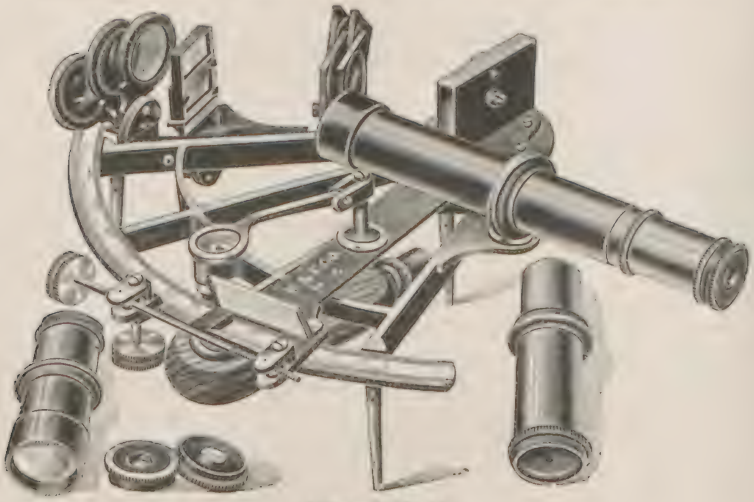


FIG. 4--SEXTANT.

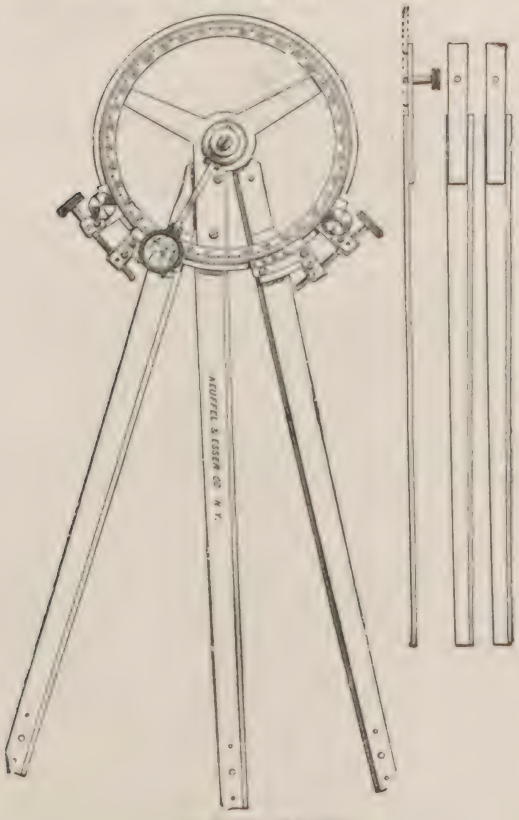


FIG. 5--PROTRACTOR.

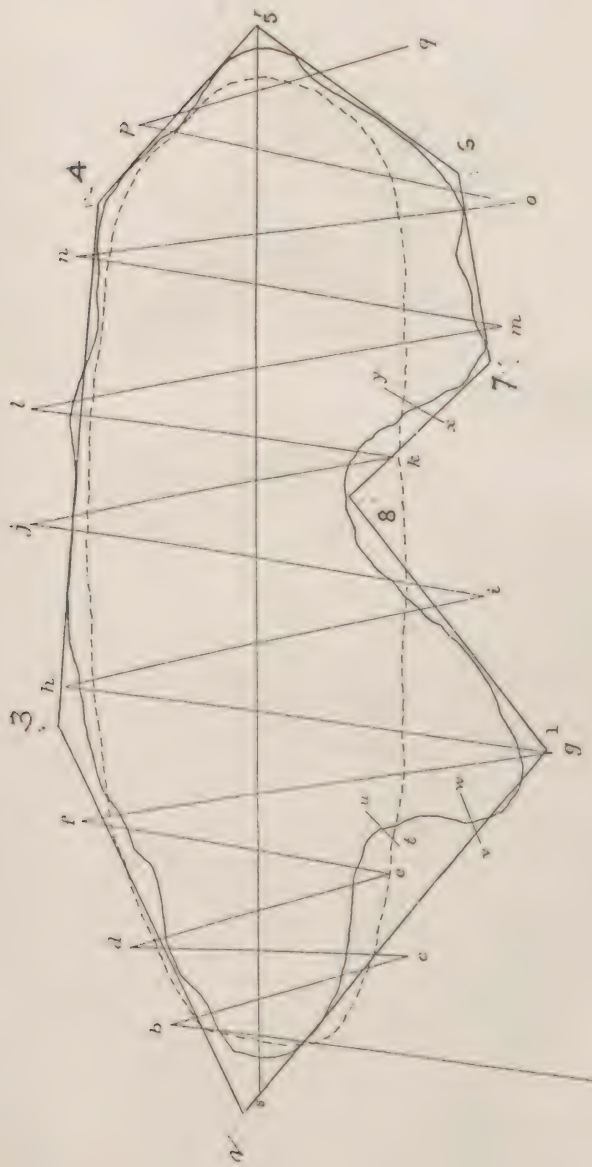


FIG. 6.

DRAWING TO ILLUSTRATE METHOD OF SURVEYING OYSTER GROUNDS. DOTTED LINE: APPROXIMATE LIMITS OF OYSTER GROUNDS AS GIVEN BY THE LOCAL ASSISTANT. STRAIGHT LINES, A, B-Y: LINES OF SOUNDINGS. HEAVY CURVED LINE: LIMITS OF OYSTER-PRODUCING BOTTOM AS DETERMINED BY THE SURVEY. STRAIGHT LINES, 1, 2-8: LIMITS OF NATURAL OYSTER BAR AS CHARTED AND BUOYED.

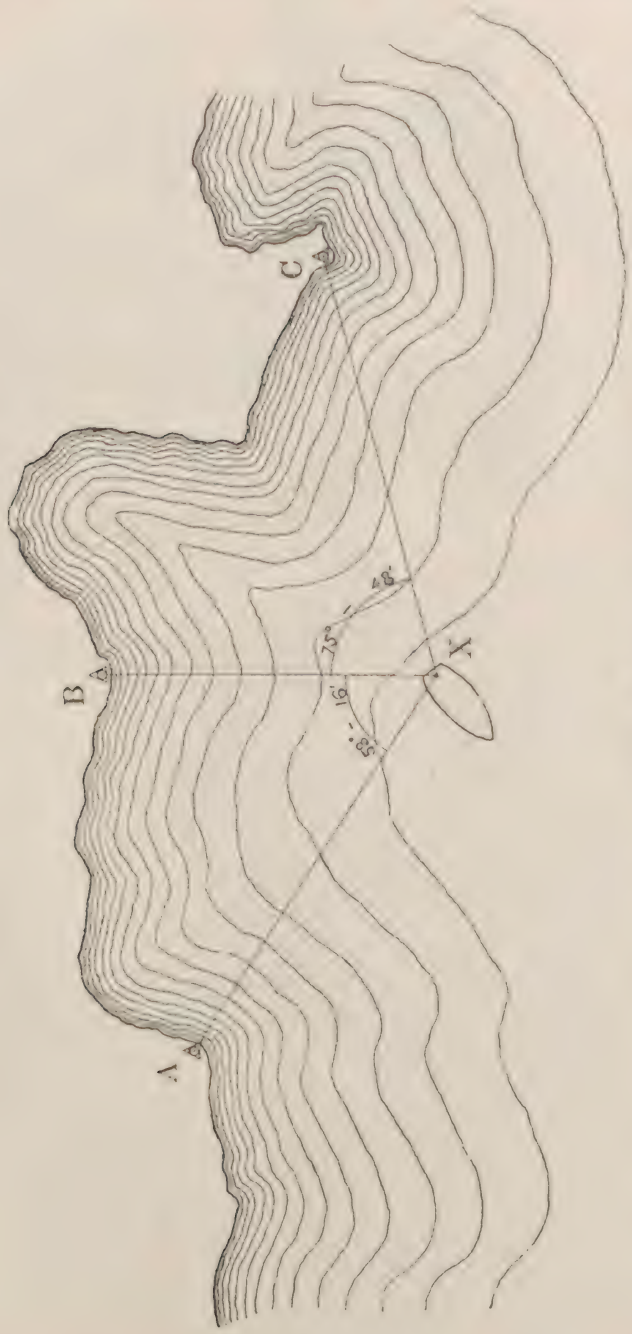


FIG. 7.
DRAWING TO ILLUSTRATE METHOD OF FINDING POSITIONS OF THE SURVEY LAUNCH OVER OYSTER GROUNDS. A, B AND C, SIGNALS ON SHORE.
X, POSITION OF OBSERVERS IN SURVEY LAUNCH. A X B AND B X C, ANGLES OBSERVED BY ENGINEERS WITH SEXTANTS.

position that the left arm passes through the plotted position of signal A, the middle arm through the plotted position of signal B and the left arm through the plotted position of signal C the point in which the three arms of the protractor meet, the centre of the hub, is the point on the chart representing the position of the boat when the sextant angles were taken.

All angles taken during the survey by the engineers are transferred to the protractor and plotted on the boat sheets by the chief engineer, while the assistant engineer records the angles in an angle record book.

During the progress of the launch over an oyster ground the leadsman, occupying a cage attached to the roof on the starboard side, forward, throws his lead line at intervals of 20-30 seconds, measuring the depth of water and testing the bottom at each cast. Having made a sounding the leadsman reports the depth of water, in fathoms and feet, and the character of the bottom in the following terms: soft, hard, sticky, rocky or grassy.

The recorder, seated in the after part of the launch with a clock before him, notifies the leadsman at the end of each 20-30 second interval, by means of an electric bell, that it is time for a sounding to be made, and in a sounding record book records the depth of water in fathoms and feet and character of the bottom in the following symbols: sft. (soft), stk. (sticky), hrd. (hard), rky. (rocky), or grs. (grassy).

The local assistant, operating the chain-wire apparatus from the forward port side of the launch, tests the oyster ground at the end of each 20-30 second interval and reports to the recorder his findings in the following terms: Barren, very scattering, scattering, medium or dense. His report is given immediately following that of the leadsman and is recorded in the sounding record book with the initial letters of the terms used to describe the condition of the ground.

The chain-wire apparatus[1] as it appears in operation is shown on insert opposite page 67 of this report.

[1] Construction of drag on chain-wire apparatus is changed according to conditions of bottom and depths. In very deep water only a single section of chain works satisfactorily.

It consists in a drag made up of three pieces of chain fastened to the middle and ends of a wooden bar two feet in length, to which by means of a short wire bridle a stout copper wire is attached. To this wire, near the point where it passes to a reel on the launch, a short stiff wire is joined by means of a clasp, which leads to a cone-chaped bell having a universally jointed clapper with adjustable disk fastened to the roof of the launch. When running a line of soundings the drag at the end of the stout wire is towed over the bottom, and from the vibrations or lack of vibrations on the wire the condition of the ground is inferred. The vibrations are detected by the hum of the disk in the bell or by holding the wire in the hand. When the drag is passing over barren bottoms the chains tow smoothly and evenly and no vibrations are transmitted to the wire, but when shells or oysters are struck by the chains the wire is made to jerk and vibrate. If the vibrations are infrequent the inference is that shells or oysters are very scattering and when the vibrations become more frequent or constant a scattering, medium or dense growth of oysters is inferred.

A small boat containing small buoys with 10-pound dumbbells for sinkers is towed behind the launch at a distance such that it remains above the chain drag. At points on each line of soundings small bouys are cast over to mark stations to be occupied and examined by the "INVESTIGATOR" which, with an expert tongman, follows the survey launch (see insert opposite page 16). The position of each buoy on the line of soundings and the number of each is recorded in both the angle record and sounding record books. Their positions are also plotted on the boat sheets, being indicated by small flags (see page 77).

Between consecutive plotted positions of the launch in a line of soundings, shown in figure 8 by the numerals above the lines (32-41), seven observations of the depth of water, character of the bottom and condition of the oyster ground have been made. The positions of these observation stations are plotted on the lines of soundings by dividing the part of the plotted line between consecutive positions of the launch into eight equal spaces, the points separating these spaces indicating the positions of the sounding stations. The findings of the local assistant with the chain apparatus at these stations are indicated by writing the symbols B, V, S, S, M or D below the lines as shown in figure 8.

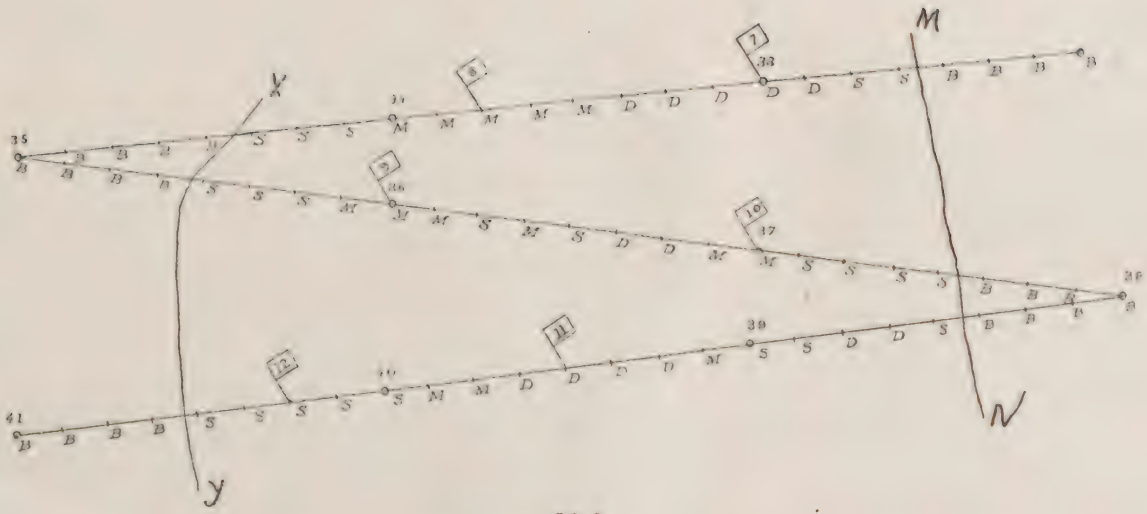


FIG. 8.

THREE LINES OF SOUNDINGS PLOTTED TO SHOW:

(A) POSITIONS LOCATED BY ENGINEERS: 33, 34-41.
(B) CONDITION OF BOTTOM: B, S, M, D, ETC.
(C) STATIONS MARKED FOR EXAMINATION: FLAGS 7, 8-12.
(D) METHOD OF PLOTTING LIMITS OF OYSTER-PRODUCING AREA: CURVED LINES.

The results of the use of the chain-wire apparatus having been thus plotted on the lines of soundings, the limits of the oyster or shell covered bottom are then shown upon the boat sheet by drawing a line (X-Y and M-N in figure 8) across the ends of the lines of soundings through the spaces which separate the soundings, indicating barren bottom, from those indicating the presence of shells or oysters.

This line, indicating the limit of the oyster-producing bottom, does not mark the official limits of the oyster ground, but it serves as a guide for enclosing the ground within a straight-sided figure (see figure 6 on page 73) such as is designated shall be used to define the limits of the natural bars by Section 90 of the Haman Oyster Culture Law.

FIELD AND OFFICE WORK.

(Compiled by the Chief Hydrographic Engineer, Swepson Earle, from his Log-book.)

At the beginning of the fiscal year October 1, 1907, the houseboat "Oyster" was still anchored at Mt. Vernon, Wicomico River, as it was convenient to survey the oyster bars in Wicomico County waters to the mouth of Nanticoke River from that station. While at Tyaskin Station, where the "Oyster" was moved October 16, the Commission decided to survey Worcester County waters upon the completion of Wicomico County and as it was not possible or practicable to move the houseboat "Oyster" to Chincoteague Bay, preparations were made to establish headquarters for the Shell Fish Commission party at Stockton, Maryland, while the Coast and Geodetic Survey party made arrangements to establish headquarters at Chincoteague Island, Virginia. The houseboat was towed, on November 15, 1907, to Colbourne's Creek, a tributary of the Big Annemessex River and a small party with the launches "Canvasback" and "Investigator" completed the buoy work of Somerset County.

Owing to foggy weather the Coast Survey party under the assistant detailed by the Bureau was delayed with the triangulation in Worcester County. Hydrography of the oyster bars was started November 28, 1907, and was pursued every available day until December 18, when work was completed. To make the survey in Chincoteague Bay, two gasoline launches of very light draft were used, owing to the shoal water over the bars in that locality. The examinations on the bars were

made from a "poling scow" (the type of boat used by oystermen in Worcester County); this boat being towed to the various spots by one of the launches. The party was transferred by team each morning from Stockton to George's Island Landing, a distance of about two and one-half miles, where the launches were anchored each night. Ice, some snow and considerable blustry weather was encountered while making the survey.

The Commission decided, upon completing the work in Worcester County, to abandon field work for the winter and arrangements were made to have the houseboat towed to Baltimore and crew laid off, only the boatswain to remain on board as ship keeper. This was carried out December 23, 1908, the houseboat "Oyster" was moored alongside of Jones Falls Dock.

During the winter the drafting-rooms on the houseboat were used to make leasing charts and duplicate finished sheets covering the area of oyster bottoms surveyed in Somerset, Wicomico and Worcester counties. One of the assistant engineers and draftsman were engaged on this work.

The Commission's Hydrographic Engineer had his office in the State House at Annapolis, where one of the assistant engineers worked on charts. Considerable time was spent with the Coast Survey representative at his offices located in the Custom House, Baltimore, relative to official corners, areas, and bars, and looking after the making of leasing charts on the houseboat.

Oyster-lot work in Anne Arundel County was taken up early in the spring (April) and the natural oyster bars of Wicomico County were buoyed off and the missing buoys previously established to mark the Somerset County bars, were replaced.

The houseboat "Oyster" was hauled out on the ways and some slight repairs made during the month of April; she was placed in commission and towed to Solomon's Island, Patuxent River, May 2, 1908.

The launch "Canvasback" of the U. S. Bureau of Fisheries was overhauled and repaired for the season's work and placed in commission.

The houseboat was painted and preparations for hydrography were made during the month of May while the Coast and Geodetic Survey shore stations were being erected and cut in along the Bay shore and in the entrance to the Patuxent

River. Hydrography of the oyster bars for the season 1908, was started June 1st.

From the Solomons Island station the oyster bars in Chesapeake Bay adjacent to Calvert County and south of Holland Point, were surveyed, also the entrance and the Patuxent River as far up as Point Patience, and part of the Bay adjacent to St. Marys County, between Cedar Point and Point No Point Lighthouse.

The State steamer "Gov. McLane," commanded by Capt. James A. Turner, under the directions of the Commission's Engineer, was used in making the survey of all the bay bars to the 2-fathom curve; the launch "Canvasback" was used to develop the oyster area inside of this depth curve. Both launches were towed to and from the working grounds by the steamer.[1]

To facilitate long runs of the launch party engaged in erecting the shore stations, the houseboat was towed, on August 3, 1908, to St. Leonards Creek, Patuxent River, from which station the survey of the oyster bars was carried up the Patuxent to Broome Island, and a section of the St. Marys Bay shore south of Cedar Point was surveyed.

From August 18 to September 3, 1908, the houseboat was anchored in Battle Creek, Patuxent River, from which station the survey of the balance of the oyster bars in that river including those of Charles County were completed.

The houseboat "Oyster," with launches and equipment, was towed to the Potomac River (Smiths Creek), September 3, to survey the oyster bars located in Maryland's tributaries of that river.

The bars located along the bay shore of St. Marys County, between Point No Point Lighthouse and Point Lookout were surveyed from the Smiths Creek station. The launches were moved around to St. Jeromes Creek, where they were anchored at night until this section was completed. The party walked over the ridge of land separating the above two creeks each morning, when the steamer McLane was not used. Fog followed by blustry weather caused the completion of this work to be delayed.

[1] Owing to the absence of harbors along the Calvert County Bay shore, it was necessary to steam, some days, 25 miles to the working grounds.

October 7, 1908, the houseboat was towed to St. Marys River and from which station that river and St. Georges Creek were surveyed.

It was then decided to move to the Wicomico River, leaving Breton and St. Clement bays until last. The reasons for going to the Wicomico River first, are as follows:

1st. In order to be certain of completing Charles County this season.

2d. The Wicomico being an exposed river for anchorage of houseboat, launches and work, we desired to take advantage of the best weather.

The "Governor McLane" towed the "Oyster" to Rock Point, Wicomico River, October 28, and work in that river was carried on until completed, November 23d. One of the State steamers was expected to tow the houseboat to Bretons Bay but was delayed up the Chesapeake by fog. The four launches, on November 25th, towed the houseboat to Breton Bay, off Leonardtown.

While waiting for the Government shore stations to be erected and located in the uncompleted bays, the Hydrographic Engineer took a small party to Stockton, Md., and established the State buoys in Worcester County waters; returning to the houseboat at Leonardtown, December 7, 1908.

Hydrography was carried on until December 15th, when completed. Detail work of checking up old oyster lots and establishing tidal bench marks was finished up December 16. This completing the oyster survey of the Western Shore south of Baltimore.

The houseboat "Oyster," with launches and equipment, was towed to Baltimore, December 18 and 19, by the "Governor McLane," and was placed in winter quarters at Spedden's Shipyard.

Anchorages of Houseboat "Oyster" From October 1, 1907, To December 31, 1908.

SOMERSET COUNTY.

Mount Vernon, Wicomico River..... October 1 to October 16, 1907.

WICOMICO COUNTY.

Tyaskin, Nanticoke River.....October 16 to November 15, 1907.
*Marion Station, Big Annemessex River. November 15 to December 19, 1907.
BALTIMORE, MARYLAND..... December 22, 1907, to May 2, 1908.

CALVERT COUNTY.

Solomons, Patuxent River.....May 2 to August 3, 1908.
Sollers, St. Leonards Creek,
Patuxent River.....August 3 to August 18, 1908.
Adelina, Battle Creek, Patuxent River...August 18 to September 3, 1908.

ST. MARYS COUNTY.

Wynne, Smith Creek, Potomac River....September 3 to October 7, 1908.
St. Marys City, St. Marys River.....October 7 to October 28, 1908.

CHARLES COUNTY.

Rock Point, Wicomico River..... October 28 to November 25, 1908.

ST. MARYS COUNTY.

Leonardtown, Breton Bay.....November 25 to December 17, 1908.
BALTIMORE, MARYLAND..... December 20 to December 31, 1908.

---

*Party on houseboat under Assistant Engineer establishing buoys, while hydrographic party under Chief Engineer established headquarters at Stockton, Md., while making survey of the waters of Worcester County with local launches.

TABULATED STATEMENT OF OPERATIONS OF FIELD PARTY.

OCTOBER 1, 1907, TO DEC. 31, 1908.

	1907.			1908.											
Months Engaged.	Oct.	Nov.	Dec.	Jan.	Feb.	Mch	Apr.	May.	June	July.	Aug	Sept	Oct.	Nov.	Dec.
Days engaged in surveying natural oyster bars	10	3	8	....	.....	....	....	..	13	16	14	12	18	6	6
Days engaged in surveying and charting old oyster lots	2	4	.....	.....	.....	.....	.....	.....	.....	5	5	.....	2	1	1
Days engaged in office work at Annapolis and Baltimore	.....	.....	3	26	25	23	14	8	.....	.....	.....	....	...	.....	3
Days when weather conditions were unfit for outside work. Office work (duplicating records, platting, clerk's and office correspondence) on houseboat and at Stockton, Md.	8	8	6	.....	.....	.....	.....	6	5	2	5	4	4	7	1
Days engaged in establishing buoys, to mark corners of natural bars	2	5	1	.....	.....	.....	6	5	....	....	.....	.....	.....	.....	3
Days engaged surveying oyster lots under Haman Oyster Culture Law	.....	.....	.....	..	.....	3	6	.....	.....	.....	.....	.....	.....	.....	.....
Days engaged moving field party	1	2	2	.....	.....	.....	.....	3	.....	....	1	1	1	2	3
Miscellaneous work. Preparing for hydrography, establishing tide gauges, &c.	4	2	1	.....	.....	.....	.....	4	8	3	1	8	2	7	3
Sundays and holidays.	4	6	10	5	4	5	4	5	4	5	5	5	4	7	*11
	31	30	31	31	29	31	30	31	30	31	31	30	31	30	31

*Leave granted assistants.

TABULATED STATEMENT OF OPERATIONS OF FIELD PARTY—(CONTINUED.
OCT. 1, 1907, TO DEC. 31, 1908.

	1907.			1908.											
Months Engaged	Oct.	Nov.	Dec.	Jan.	Feb.	Mch.	April	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec	Total.	
																Nautical	Statute
Miles of sounding lines	49.5	8.5	46.9						92.5	130.1	109.7	64.1	98.8	57.8	45.1	703.0	808.5
Number of soundings taken	3,322	624	3,090						5,281	6,510	6,119	3,317	6,258	2,941	1,841	39,303	
Number of angles observed	1,468	166	982						2,346	3,254	3,070	1,628	2,770	1,416	1,064	18,164	
Number of positions located on sounding lines	734	83	491						1,173	1,627	1,535	814	1,385	708	532	9082	

Number of square miles surveyed	91.3
Number of acres surveyed	58,458
Number of buoys established	305
Number of oyster lots surveyed under Haman Oyster Culture Law	23
Number of old oyster lots checked and charted	220

STATISTICS OF RESULTS OF THE COMBINED OPERATIONS OF GOVERNMENT AND STATE.

FROM JUNE, 1906, TO DECEMBER 31ST, 1908.

	COUNTIES.							
	1 Anne Arundel	2 Somerset	3 Wicomico	4 Worcester	5 Calvert	6 St. Marys	7 Charles	Total (7)
Oyster bars surveyed and delineated	91	37	15	28	42	125	15	353
Acres of oyster bars surveyed and delineated	33,666	27,566	2,038	1,655	12,303	25,789	2,361	105,369
Crab bottoms surveyed and delineated		54						54
Acres of crab bottoms		32,108						32,108
Number of clam beds surveyed and delineated		3						3
Acres of clam beds		506						506
State oyster buoys located and placed	362	154	53	104				673
Miles of sounding lines over shell bottoms (stat.)	424.5	340.4	59.0	62.9	249.8	339.9	38.2	1,574.7
No. soundings and chain wire readings over shell bottoms	37,049	17,904	3,387	3,649	11,292	19,344	1,631	94,256
Square miles covered by soundings	58	55	3.18	2.54	30.35	56.98	4.37	210.42
Triangulation land marks established	123	86	30	48				
Square miles of water covered by triangulation	220	375	44	110				
Miles of shore line covered by triangulation	110	125	46	95				
Oyster investigation stations occupied	440	679	162	147	667	1,472	113	3,680
Projections prepared and platted	9	13	2	5				
Leasing charts prepared	13	12	2	2	5	10	2	46
Oyster charts published	4	6	2	3				
No. of tide stations established	4	3	1	1	2	4	1	16
No. of old oyster lots checked	15	300	71		81	58	10	535
No. of oyster lots surveyed under new law	39							39

*Until open for leasing complete statistics for Calvert, St. Marys and Charles counties will not be published.

BUOYS.

STATE BUOYS.

Construction.

Provision is made in Section 86 of the Haman Oyster Culture Law for marking the corners of all natural oyster bars with buoys to enable oystermen to see, before the period has elapsed during which appeals may be made to the Circuit Court, that none of the natural bars have been missed by the survey party.

Since the number of buoys required to mark the corners of the natural oyster bars in the State will be very large, probably not less than 2,000, the problem of constructing a buoy which will be satisfactorily permanent and at the same time not too expensive for practical use, has been difficult.

The two types of buoys adopted by the Commission were designed by the chief engineer. The plan of the construction of the larger is shown in figure 9.

The larger buoy (a), is composed of a spar and sinker and a mechanism of iron for connecting the two. The spars, 20-50 feet in length, are made from cypress [1] saplings and trees. The saplings, when the bark has been removed, are allowed to season. Then each spar is given a coat of red lead to fill pores and cracks, and shortly before establishing, the section to be submerged is given a coat of copper paint to protect it against worms, the upper part painted white. The words STATE BUOY are branded into the wood near the top.

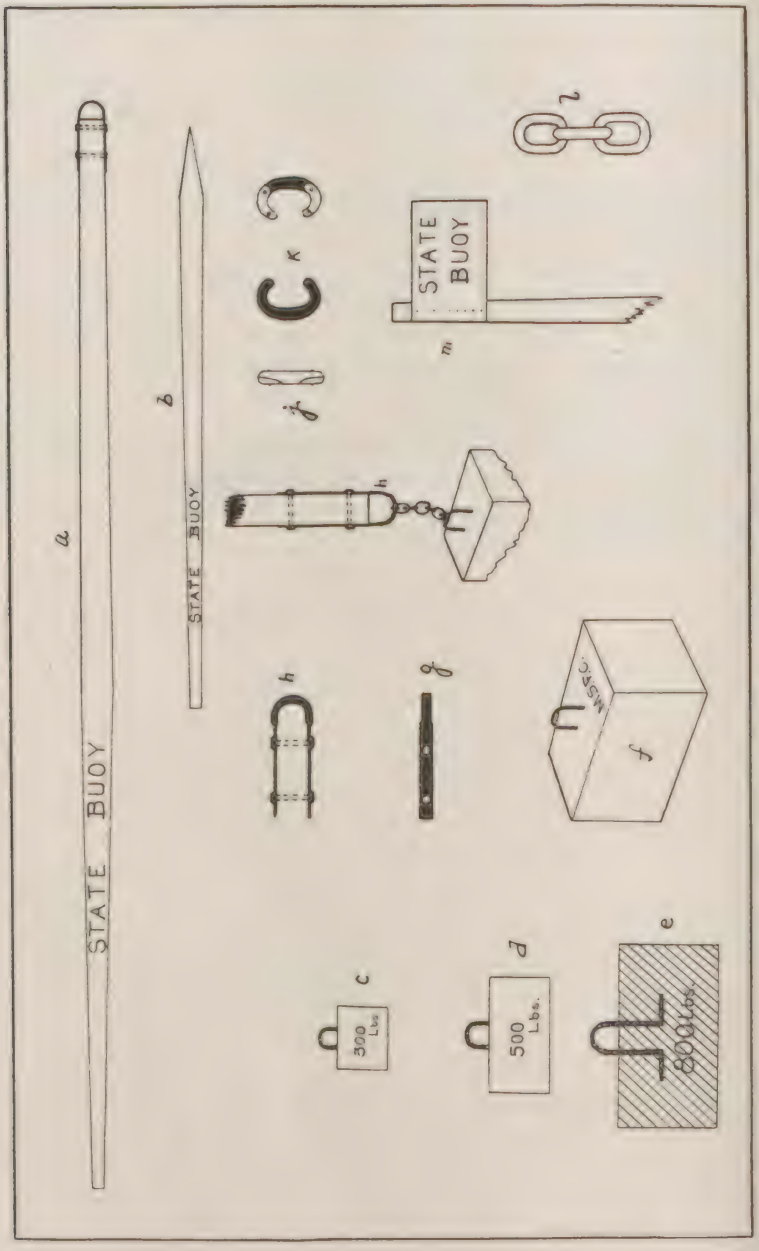
The sinker or anchor by which the spar is kept in position is a concrete block (c, d, e, f), in which a ¾-inch iron staple is embedded. These blocks of concrete are of three sizes, weighing respectively 300, 500 and 800 pounds, and are constructed by the Commission at buoy stations established for this purpose.

[1] Bull-pine saplings could not have been used for floating spars on account of their tendency to waterlog and sink, but such saplings have been used for stake buoys in shallow water.

The mechanism for connecting the spar to the sinker (g, h, j, k), consists of a U-shaped piece of wrought iron, attached to the lower end of the spar by means of lag screws and bolts, and a chain. The sides of the U-shaped piece are flattened to a thickness of ½ inch and a width of 2 inches, but the middle part is left round to prevent its being worn by the friction of the chain. Two sizes of chain are used, ½-inch and ¾-inch, with simple split links to join the ends of the chain when it is passed through the U-shaped iron on the spar and the staple in the sinker.

The average price of these buoys completed is $2.57 each, the average cost of the spars, $1.05, that of the sinkers, 92 cents and that of the connecting part, 60 cents.

Stake buoys are used to mark the corners of oyster bars over which the depth of water does not exceed 10 feet. They are made of bull-pine saplings, from which the bark has been removed. As in the case of the floating spars, the part beneath the water is painted but with copper only, the upper part painted white. The lower end is sharpened to facilitate driving or pumping into the bottom.



DRAWINGS TO ILLUSTRATE THE CONSTRUCTION OF "STATE BUOYS"

Establishment.

When the limits of the natural bars have been ascertained and the corners have been established by the Commission and plotted on the projections, buoys, adapted to the depth of water at each corner, are selected, placed on the scow and taken, by the launch "CANVASBACK" or the steamer "GOVERNOR ROBERT M. McLANE," to the places for which they were designed. The exact location of each corner is ascertained by the chief engineer by the use of sextants, and the buoys are dropped under his direction.

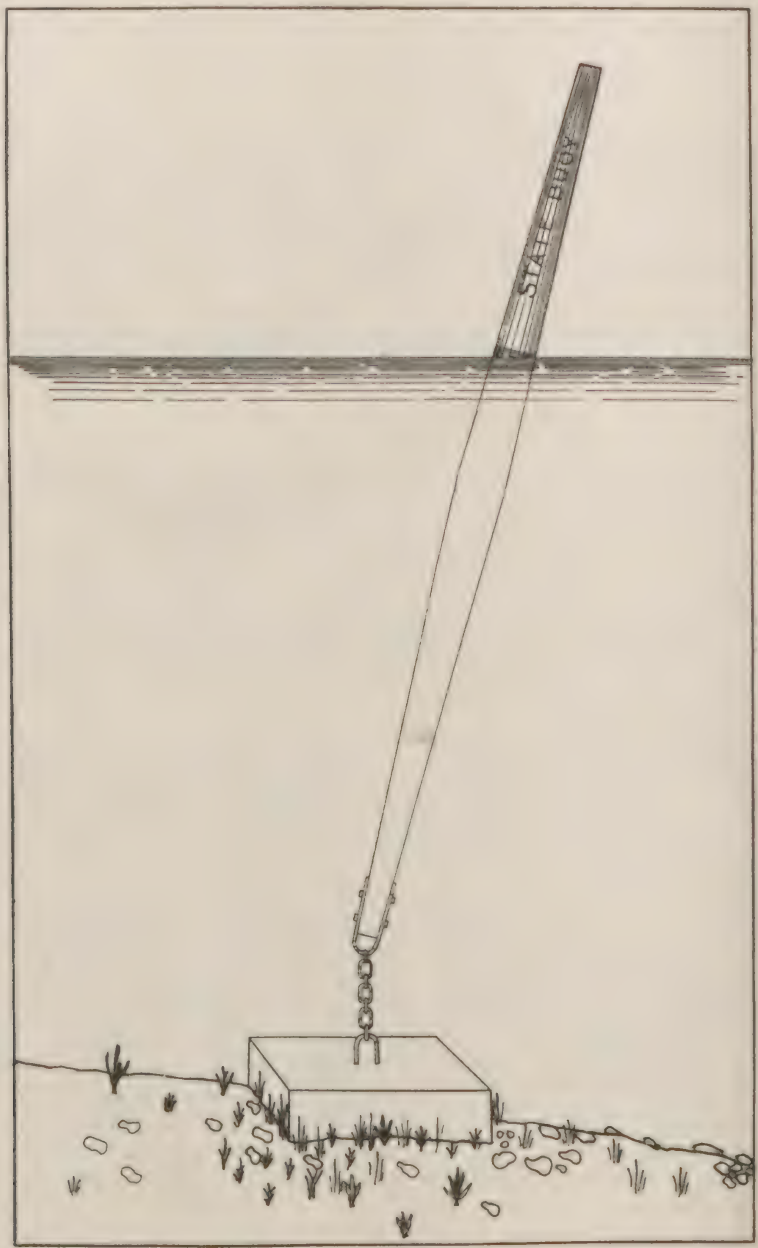
Effect of Water and Ice on State Buoys.

"The wood from which the buoys marking the corners of the natural oyster bars in Anne Arundel and Somerset counties were made, was of two varieties—Cypress and Bull Pine.

Cypress has been used exclusively as a floater to mark the corners of the natural bars in bold waters, while bull-pine stake buoys have been placed to mark the inshore limits of the bars where the water was found to be less than eight feet in depth at mean low water.

The first buoys to be established were those in the waters of Anne Arundel County during the winter and early spring of 1907. The total number of buoys placed was 362; of this number more than 60 per cent. were floaters. (For type and construction, see pages 88 and 90.)

The cypress buoys established in Anne Arundel County waters were well seasoned and were given a coat of copper paint before placing in position; the section of buoy above water was painted *white*. Some of these buoys were examined after they had been established six months as it was perceptible that they had settled from one to three feet. These buoys were found to have absorbed considerable water which was attributed to the wood having been very dry and porus. The engineer of the Commission decided, before establishing future buoys, to treat the wood by applying one or two coats of red lead before putting on the copper and white paint.



DRAWING TO ILLUSTRATE CONSTRUCTION OF "STATE BUOYS" USED BY THE COMMISSION TO MARK THE CORNERS OF NATURAL OYSTER BARS

One hundred fifty-four bouys were established in Somerset County waters during the fall of 1907; of this number 80 were floaters.

The buoys marking the natural bars in Wicomico County waters were placed in the spring of 1908, and the missing buoys marking the natural oyster bars in Somerset County were replaced. It was found that 90 per cent. of the cypress buoys previously established in Somerset County had stood the ice and winter, were in place, floating high and had absorbed but little water. The stake buoys, on the other hand, had suffered by the floating ice and most of them had been carried away.

PLANTERS' BUOYS.

The State buoys established to mark the limits of the natural oyster bars are valuable as markers for a limited time only. After the survey of the waters of a county or section thereof has been completed and before the charts and reports are filed in the office of the clerk of the Circuit Court for the respective counties, as provided for under Section 86 of the Oyster Culture Law, the buoys are placed. These buoys must remain in their established positions for a period of four (4) months from the date on which the barren bottoms of the county are opened for lease; this is to give both oystermen and planters a chance to appeal in case natural bars have been omitted or barren bottoms included. (See Sec. 89 of Chapter 711, Acts 1906.)

The planters on the other hand are obliged to permanently maintain their buoys or stakes marking the corners of their oyster lots leased to them by the State.

Experience has shown the necessity of maintaining markers for oyster lots.

1st. To restrict planters from using larger areas than they are legally entitled to hold.

2d. To prevent encroaching on the natural bars lying adjacent to leased lots, or on a leased area by oystermen, which cause disputes and unfriendly relations.

3d. To prevent disputes relative to location of corners marking legal boundaries of planters' lots adjacent to one another.

Color and Construction.

Buoys and aids to navigation established by the Government to mark channels and shoals are given a standard color by the U. S. Lighthouse Board; the color and shape of these buoys are recognized by all mariners navigating Chesapeake Bay and its tributaries. In order not to mislead navigators or interfere with Government regulations by color of buoys established under the direction of the Shell Fish Commission, the Commission directed their engineer to take up this matter with the Inspector of the Fifth Lighthouse District at Baltimore who has direct charge of Aids to Navigation established in Chesapeake Bay.

Correspondence With Fifth Inspector.

(Copy.)

SHELL FISH COMMISSION
ANNAPOLIS, MARYLAND
M. S. F. C. "HOUSEBOAT OYSTER."

ROCK POINT, MD., Nov. 5, 1908.

LIEUT. COMD'R ROBERT L. RUSSELL, U. S. N.,
Inspector, 5th Light-House District,
Baltimore, Md.

SIR:—At the time the Maryland Shell Fish Commission was created (April, 1906) to survey and mark off the limits of the natural oyster bars under the waters of the State of Maryland, I had verbal authority from Admiral U. Sebree, U. S. N., then Naval Secretary of the Light-House Board, to paint such buoys as we established, *white*. This color Admiral Sebree stated would not interfere with aids to navigation placed under the Lighthouse Establishment.

The white buoys we establish to mark the corners of the natural bars are not maintained by the Commission longer than six months. At the expiration of the oystermen's right of appeal the buoys are not replaced when carried away.

The oyster planters when leasing ground from the State are forced to keep up and maintain buoys or stakes which mark their corners. In order to establish a uniform color for such buoys or stakes that will not interfere with aids to navigation, I propose a buoy painted half white and black, horizontally, above the water's surface, and respectfully ask your approval of this color. Most of our leasable bottoms are located inshore of the natural oyster bars and the planters' buoys would in most cases be out of the road of navigation.

Respectfully yours,
(Signed) SWEPSON EARLE,
Hydrographic Engineer, Md. Shell Fish Com'n.

DEPARTMENT OF COMMERCE AND LABOR
LCH LIGHT-HOUSE ESTABLISHMENT
OFFICE OF INSPECTOR, 5TH DISTRICT
BALTIMORE, MD.
November 4, 1908.

MR. SWEPSON EARLE.
Hydrographic Engineer,
Maryland Shell Fish Commission,
Annapolis, Maryland.

SIR:—In reply to your letter of November 5th, relative to the color for the buoys to mark the lots assigned to oyster planters in the navigable waters of Maryland, in which you suggest a buoy painted half white and half black, horizontally, I would state that as the black and white perpendicularly striped buoy is the one used for the purposes of navigation, I would suggest that you use for the purpose named, a buoy painted red and white, which is not a combination of colors used for aids to navigation.

Respectfully,
ROBT. L. RUSSELL.
Commander, U. S. N.,
Light-House Inspector.

(Copy.)

SHELL FISH COMMISSION
ANNAPOLIS, MARYLAND
HOUSEBOAT OYSTER,
LEONARDTOWN, MD., December 11, 1908.

COMMANDER ROBERT L. RUSSELL, U. S. N.,
Inspector, 5th Light-House District,
Baltimore, Md.

SIR:—In reply to your letter of November 14, 1908, relative to color of buoys to mark oyster lots assigned to Maryland oyster planters, I would state that the color you suggest, a buoy painted red and white, will suit our purpose very well.

Respectfully,
(Signed) SWEPSON EARLE.
Hydrographic Engineer.

DEPARTMENT OF COMMERCE AND LABOR
LCH LIGHT-HOUSE ESTABLISHMENT
OFFICE OF INSPECTOR, 5TH DISTRICT
BALTIMORE, MD.
December 16, 1908.

MR. SWEPSON EARLE,
Hydrographic Engineer,
Shell Fish Commission,
Annapolis, Maryland.

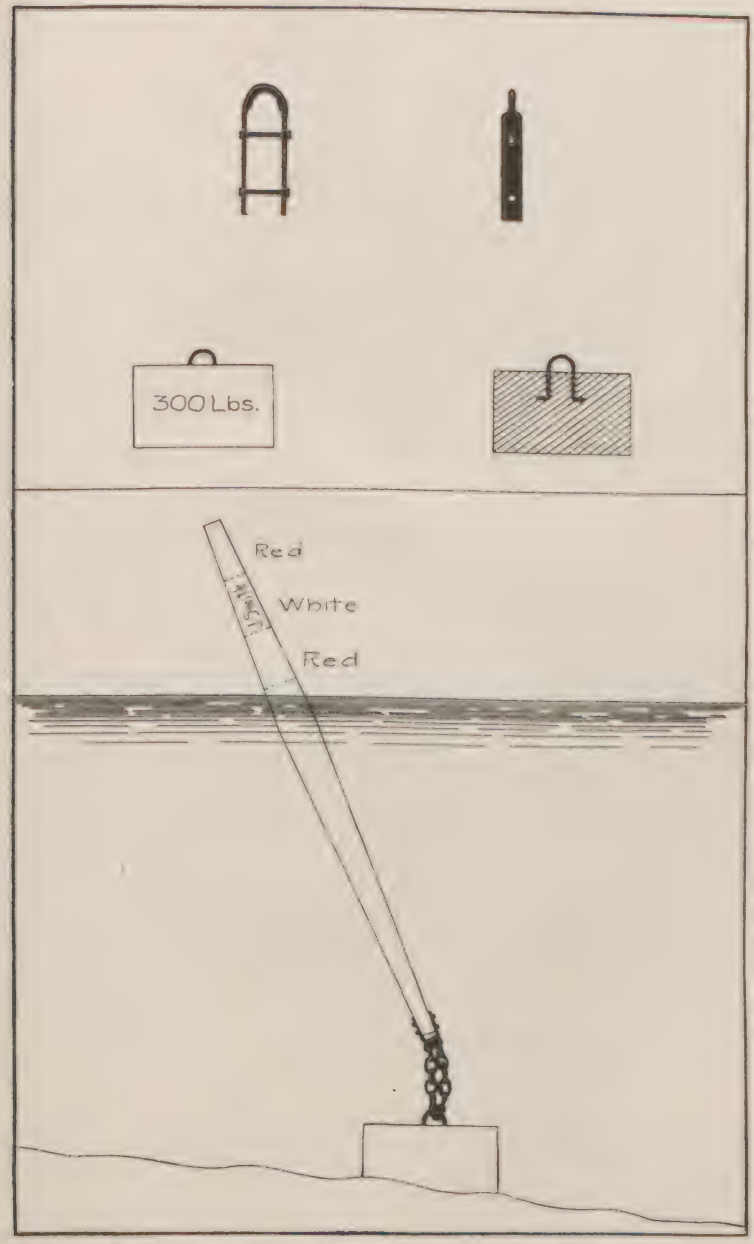
SIR:—Replying to your letter of December 7th, regarding the color of the buoys to mark private oyster lots, you are informed that the use of red and white buoys for this purpose will be satisfactory.

Respectfully,
ROBT. L. RUSSELL,
Commander, U. S. N.,
Light-House Inspector.

The Commission has adopted colors for its buoys that conform to Government regulations, which are as follows:

To mark the corners of the natural oyster buoys—A spar buoy painted WHITE, with the words "STATE BUOY" branded or painted thereon.

Color of buoys to be used by planters to mark corners of their oyster lots—RED AND WHITE in horizontal stripes. (See figure opposite.)



DRAWINGS TO ILLUSTRATE CONSTRUCTION OF BUOYS RECOMMENDED FOR USE BY PLANTERS TO MARK CORNERS OF LOTS LEASED FOR OYSTER CULTURE

The engineer to the Commission suggests to planters a buoy and anchor of simple construction, yet cheap and durable. (See page 95.)

This buoy, in construction, is the same as the State buoy adopted by the Commission, which has given satisfactory results.

To mark all corners having a depth of water more than 6 feet the floating buoy with concrete anchor will be found more reasonable in the course of time than a stake driven or pumped into the bottom. A 300-pound block will be found of sufficient weight to hold a seasoned buoy in depths not exceeding 3 fathoms (18 feet), beyond that depth to 5 fathoms (30 feet) increase weight to 500 pounds. In water over 30 feet deep increase weight 100 pounds for every 10-foot increase in depth.

Woods found in Maryland best adapoted to float and withstand becoming water-logged are cypress, cedar, and long-leaf pine.[1] A tree that is selected for a buoy, after cutting, should be skinned, shaped up and allowed to season for at least two months. A good coat of red lead should be given the entire buoy to fill up cracks. The section of buoy that is to be submerged should have one or two coats of copper paint before placing the buoy in the water. Planters will find it more economical to be supplied with two sets of buoys in order that they can be changed every six months. The concrete block can be hauled out with the buoy and the spot can be marked by a temporary flag buoy while the change is being made. At least six (6) feet of this buoy should stand above water and should be painted according to authorized colors: Upper two feet of buoy be painted RED, middle two feet "WHITE" with name of lessee painted in black on two sides of buoy, and lower two feet painted "RED."

No. 6 galvanized wire can be used to connect the buoy with its anchor, as it will be found cheaper and lighter than chain."

[1] Bull pine will water-log and sink in a short time.

LEASED OYSTER GROUNDS.

The number of leases granted by the Shell Fish Commission to residents of the State for lots to be used for the purposes of oyster culture, prior to December 15th, 1908, which are now valid, is 491, covering a total area of 2,230 acres.

Of this number 388 leases covering 1,522 acres of bottom are those which have been granted in accordance with the provisions of Section 108 of the Haman Oyster Culture Law to lessees who desired to continue to hold the oyster lots held by them under former law.[1] The remaining 103 leases covering 708 acres of bottom are those which have been applied for in Anne Arundel and Somerset counties, under the Haman Oyster Culture Law.

The distribution of the lots now leased for oyster culture within the limits of the various tide-water counties; the area of bottom covered by each lease, and the name and address of each lessee, is given in the tables and lists which follow.

In this connection, attention should be called to the fact that the barren bottoms of two counties only, Anne Arundel and Somerset, were available for lease at the end of the fiscal year, 1908, and that in Anne Arundel County alone the opportunity to lease had come to all persons who might desire to exercise such a right. On the date mentioned the right to lease the bottoms available for oyster culture in the waters of Somerset County had but just passed to "oystermen," the period of four months, during which the owners of land bordering upon Somerset County waters had the prior right to lease, having ended on November 1, 1908. Residents of the State not included among "riparian owners" and "oystermen," who may desire to take up some of the bottoms available for oyster culture in Somerset County, will not have the right to take out leases until May 1, 1909.

---

[1] As reported on page 74 of the First Report of the Commission. There were 4,009 holders of lots under former oyster culture law who were given an opportunity to retain their holdings under the present law. Of this number 849 only applied for leases and less than half of those who made application finally executed leases to the State.

The number of leases herein reported is therefore clearly no indication of the interest which exists in oyster culture in Maryland nor a measure of the success to be attained through the present plan of developing the industry.

It is estimated that with the present rate of progress the actual survey of all of the oyster grounds of the State will have been completed by October 1, 1910, and that the charts showing the location of the oyster bars in the locality last to be surveyed will have been published and filed not later than June 30, 1911. Allowing four months from this date, the period during which "riparian owners" have been given priority over all other citizens to lease the barren bottoms adjacent to their land; an additional six months for the period during which "oystermen" have a priority in leasing; and still another six months during which other residents of the State (members of the general public) may take out leases to the bottoms which may remain, it is readily seen that not until near the end of the year 1912 will it be time to judge of the result of the operation of the Haman Oyster Culture Law to establish oyster culture in Maryland.

UNPAID RENTS.

The Commission has not been able to collect rents due from 188 of the above lease-holders amounting to $2,055.03. The location of the lots on which the rents are in arrears may be seen from the following table. The leases covering these lots have not been declared void because of a belief on the part of the Commissioners that the greater part of the rents now overdue will be paid when the restrictions placed upon oyster culture are removed.[1]

Number Lease Holders in Arrears With Rent.	*County.*	*Amount of Rent Overdue.*
7	Anne Arundel	$ 74.99
12	Calvert	97.32
6	Charles	45.30
41	Dorchester	467.50
1	Kent	20.00
3	Queen Anne	28.00
87	Somerset	1,006.63
7	St. Marys	64.00
16	Talbot	149.29
8	Wicomico	102.00
Total, 188		$2,055.03

[1] See pages 117-429.

FORMS OF APPLICATION.

It is deemed expedient to reproduce herewith, the several forms of application adopted by the Board of Shell Fish Commissioners, with reference to the various classes of applicants, to wit: Riparian Owners, Boatmen, and Applicants Without Priority, under the Haman Oyster Culture Law.

FORM B.

APPLICATION FOR A LEASE

TO THE BOARD OF SHELL FISH COMMISSIONERS OF MARYLAND.

ANNAPOLIS, MARYLAND.

The application of....., *a resident of*....., *in the State of Maryland, respectfully shows:*

1st. That this applicant is a citizen of said State of Maryland, residing in....., *in the State aforesaid.*

2nd. That he wishes and intends to use the grounds hereinafter described for planting or cultivating oysters.

3rd. That at the time of the opening for oyster culture of the areas of said....., *and at the present time,*....., *he was, and is, the owner of a certain lot, tract, piece or parcel of land, situate, lying and being on the waters of the*....., *in said State, having a water front of at least*.....*yards; and that the area adjacent to the riparian lands of this applicant was opened for oyster culture as aforesaid within four months from date hereof.*

The undersigned, therefore, requests hereby, that said Board lease to.....
.....*in the name and on behalf of the State of Maryland*.....*acres of ground located under the waters of the State of Maryland, which ground is adjacent to the aforesaid land, as aforesaid, and is more particularly described as follows, to-wit:*

.....
.....
.....
.....
.....
.....
.....
.....
.....

Dated at....., *Maryland, this*.....*day of*....., *in the year one thousand nine hundred and*.....

.....

Applicant.

FORM C.

APPLICATION FOR A LEASE

TO THE BOARD OF SHELL FISH COMMISSIONERS OF MARYLAND.

ANNAPOLIS, MARYLAND.

The application of....., *a resident of*....., *in the State of Maryland, respectfully shows:*

1st. That this applicant is a citizen of said State of Maryland, residing in....., *in the State aforesaid.*

2nd. That upon the date of the opening for oyster culture of the areas of said....., *or upon the closing date of the last dredging, scraping or tonging season, in said*....., *said date being not less than four months, and not more than ten months from date hereof, he was a boatman employed in the business of dredging, scraping, or tonging for oysters within the areas of said State.*

3rd. That he wishes and intends to use the grounds adjacent to a certain lot, tract, piece or parcel of land situate, lying and being in said..... *County, having a water frontage of at least*.....*yards; the title to which said land is vested in a certain*..... *at*.....

The undersigned, therefore, requests hereby, that said Board lease to him, in the name and on behalf of the State of Maryland,.....*acres of ground, located under the waters of the State of Maryland, which ground is adjacent to the aforesaid land, as aforesaid, and is more particularly described as follows, to-wit:*

.....

.....

.....

.....

.....

.....

.....

Dated at..... *Maryland, this*.....*day of*....., *in the year one thousand nine hundred and*.....

.....

Applicant.

FORM D.

APPLICATION FOR A LEASE

TO THE BOARD OF SHELL FISH COMMISSIONERS OF MARYLAND.

ANNAPOLIS, MARYLAND.

The application of....., *a resident of*....., *in the State of Maryland, respectfully shows:*

1st. That this applicant is a resident of said State.

2nd. That he wishes and intends to use the grounds hereinafter described for planting or cultivating oysters.

The undersigned, therefore, requests hereby, that said Board lease to..... ....., *in the name and on behalf of the State of Maryland,* .....*acres of ground, located under the waters of the State of Maryland, which ground is more particularly described as follows, to-wit:*

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....

Dated at....., *Maryland, this*.....*day of*....., *in the year one thousand nine hundred and*.....

.....

Applicant.

FORM OF LEASE.

For the information of those interested in Oyster Culture in Maryland, the form of lease adopted by the Board is published herewith.

FORM B.

LEASE.

The Board of Shell Fish Commissioners of Maryland, pursuant to the provisions of Chapter 711, of the Acts of 1906, does hereby lease, in the name of the State of Maryland, this.....day of....., in the year nineteen hundred and....., unto....., for a term of twenty years, beginning on the.....day of .....nineteen hundred and....., and ending on the.....day of....., nineteen hundred and.....

Said.....hereby accepts the above Lease subject to all the provisions of the said Chapter 711, of the Acts of 1906, and especially subject to the payment of the rentals provided for in said Act.

BOARD OF SHELL FISH COMMISSIONERS OF MARYLAND,

By.....

President.

.....SEAL.)

Signed, sealed and delivered in the presence of

.....

TOTAL NUMBER OF APPLICATIONS FOR LEASES BY COUNTIES.

ANNE ARUNDEL COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	26	Number of acres	112	1-5
" tongers	20	" " "	136	
" riparian owners	15	" " "	145	3-4
" members of general public.	28	" " "	77	
Total	89	Total acres	470	19-20

CALVERT COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	93	Number of acres	323	45-96

CHARLES COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	23	Number of acres	105	65-100

DORCHESTER COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	163	Number of acres	776	43-120

QUEEN ANNES COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	15	Number of acres	61	7-8 5-10 P.

SOMERSET COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	301	Number of acres	1,526	3-8
" tongers	18	" " "	170	
" riparian owners	15	" " "	130	
" members of general public.	7	" " "	50	
Total	341	Total acres	1,876	3-8

KENT COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	4	Number of acres	17	3-4 24 P.
" riparian owners	1	" " "	3	
Total	5	Total acres	20	3-4 24 P.

ST. MARYS COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	73	Number of acres	250 371-800
" tongers	1	" " "	4
" riparian owners	2	" " "	9 1-10
Total	76	Total acres	263 451-800

TALBOT COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	84	Number of acres	365 17-48
" tongers	1	" " "	5
" riparian owners	1	" " "	5
Total	86	Total	375 17-48

WICOMICO COUNTY.

Number of applications received to December 15th, 1908.

From old lot holders	71	Number of acres	346 70-100

TOTAL NUMBER OF LEASES GRANTED BY COUNTIES.

Counties.	*No.*	*No. of Acres.*
Anne Arundel County	45	210 8-9
Calvert County	59	230 23-100
Charles County	15	58 65-100
Dorchester County	77	367 21-40
Kent County	1	5
Queen Annes County	7	27 157-400
St. Marys County	35	124 31-75
Somerset County	186	926 7-8
Talbot County	48	195 1861-2400
Wicomico County	18	84 1-8
	491	2,230 101-800

NAMES AND ADDRESSES OF LESSEES BY COUNTIES.

ANNE ARUNDEL COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Bast, Wm. F.	Shady Side	1	2
Bast, Wm. F.	Shady Side	2	5
Bellis, Jos. H.	Annapolis	3	10
Collins, Severn A.	Annapolis	4	3 3-4
Corner, Theo. S.	Annapolis	5	5
Clark, Geo. W.	Annapolis	6	10
Davis, Geo. A.	Edgewater	7	2 1-2
Mason, Randolph B.	Eastport	8	4 3-4
Dawson, J. W.	Mayo	9	4 3-4
Friemel, Maggie A.	Annapolis	10	5
Friemel, Chas. A.	Annapolis	11	2
Friemel, Maggie A.	Annapolis	12	1
Hartge, Edmund L.	Shady Side	13	2 95-100
Hopkins, Oswald B.	Shady Side	14	10
Hartge, Chas. F.	Shady Side	15	4 9-10
Keidel, Adelia L.	Baltimore	16	3
Keidel, Henry	Baltimore	17	5
Hooper, Eugene F.	Baltimore	18	1 1-4
Larson, Charles	Shady Side	19	3 31-100
Lerch, F. J.	Baltimore	20	5
Martin, Chas. E.	Annapolis	21	5
Martin, Jno. W.	Annapolis	22	5
Murray, Mary H.	Cumberstone	23	5
Melvin, Geo. T.	Annapolis	24	4
Melvin, Geo. T.	Annapolis	25	6
Nowell, Wm. G.	Shady Side	26	2 58-100
Nowell, Wm. G.	Shady Side	27	31 1-3
Pitcher, Matilda C.	Annapolis	28	3 3-4
Saunders, Wm. H.	Annapolis	29	5
Stevens, Lester L.	Baltimore	30	10
Smith, Samuel P.	Shady Side	31	5 1-2
Worthington, Jos. M.	Annapolis	32	5
Wilde, William	Shady Side	33	3 1-3
Wilde, Ferdinand	Shady Side	34	2
Wilde, Ferdinand	Shady Side	35	1
Williams, Chas. H.	Annapolis	36	3 7-10
Zang, William	Gallaway	37	4
Barnes, Mrs. M. C.	Eastport	38	1

Name.	*Address.*	*No.*	*No. of Acres.*
Koch, Chas. G.	Eastport	39	1
Heller, Wilhelm	Eastport	40	1
Frazier, S. R.	Eastport	41	1
Wilde, F. F.	Shady Side	42	2
Williams, Jno. F.	Annapolis	43	7 1-2
Larson, Chas.	Shady Side	44	2
Friemel, Maggie	Annapolis	45	1 1-4
			210 8-75

CALVERT COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Anderson, Charles	Solomons	1	5
Breeden, Laura V.	Prince Frederick	2	3 1-2
Breeden, Geo. L.	Soller's	3	5
Breeden, Jno. W.	Soller's	4	5
Breeden, Jake E.	Soller's	5	3
Bowen, Wise	Solomons	6	5
Breeden, Wm. E.	Soller's	7	5
Breeden, John E.	Soller's	8	4
Bowen, Helen V. M.	Wallville	9	5
Bowen, Isaac P.	Wallville	10	5
Brome, W. W.	Wallville	11	5
Brome, E. R.	Wallville	12	5
Blackburn, Wm. C.	Wallville	13	5
Breeden, B. E.	Soller's	14	5
Barrett, Daniel	Soller's	15	5
Barrett, Christian	Frazier	16	5
Dodson, Wm. I.	Solomons	17	1 9-10
Evans, T. P.	Solomons	18	3 73-100
Glover, Jno. W.	Solomons	19	2 85-100
Glover, R. M.	Solomons	20	3 1-5
Gantt, Wm. Warren	Frazier	21	1 1-4
Gantt, Jno. B.	Lusby	22	2
George, J. F.	Solomons	23	4 1-2
George, Mary J.	Solomons	24	2 1-2
Hance, Young D.	Prince Frederick	25	5
Jones, John W.	Solomons	26	1 1-4 10 P.
Joy, John B.	Solomons	27	2 3-4
Johnson, Isaac	Solomons	28	1 3-5
Ketcham, M. A.	Solomons	29	5
Ketcham, Asa C.	Solomons	30	5
Kopp, John C.	Solomons	31	5
Lore, Jos. C.	Solomons	32	2 1-2
Mister, Jno. R.	Solomons	33	1 7-8

Name.	*Address.*	*No.*	*No. of Acres.*
Northam, Wm. E.	Solomons	34	5
Overton, S. P.	Solomons	35	5
Overton, W. E.	Solomons	36	5
Overton, Daisy W.	Solomons	37	3 3-8
Overton, Chas. S.	Solomons	38	5
Overton, Daisy M.	Solomons	39	1 29 P.
Oberry, Jno. H.	Solomons	40	2
Parran, John	Prince Frederick	41	5
Parran, N. D. S.	Prince Frederick	42	5
Parran, M. B.	Prince Frederick	43	5
Parran, Benjamin	Prince Frederick	44	5
Railey, John	Solomons	45	2 1-4 34 P.
Sullivan, P. J.	Solomons	46	3-4
Seipp, Wm. H.	Solomons	47	4 3-4
Sollers, K. T.	Soller's	48	5
Sollers, Jno. E.	Soller's	49	2 1-4
Sollers, James G.	Soller's	50	5
Tongue, T. O.	Solomons	51	5
Turner, Geo. D.	Prince Frederick	52	5
Tongue, Frank	Solomons	53	2 3-4 8 P.
Tongue, F. H.	Solomons	54	1 3-4
Tongue, G. Gideon	Solomons	55	4 3-4
Tucker, Jas. T.	Solomons	56	2 3-8
Tucker, Lemuel J.	Solomons	57	2 1-4
True, Thos. H.	Solomons	58	5
Weems, Clarence	Solomons	59	4 3-4
			230 23-100

CHARLES COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Alvey, Wm. H.	Hughesville	1	5
Bowling, Frederick T.	Hughesville	2	5
Collison, George H.	Rock Point	3	3
Henderson, A. H.	Benedict	4	5
Hayden, William H.	Cooksey	5	5
Higdon, James B.	Issue	6	2 1-2
Higdon, Francis W.	Issue	7	2 1-2
Hayden, Henry A.	Tompkinsville	15	5
Jackson, John C.	Tompkinsville	8	5
Jackson, Walter L.	Tompkinsville	9	5
Lancaster, S. S.	Rock Point	10	5
Norris, James N.	Rock Point	11	3 65-100
Thomas, James E.	Benedict	12	5
Norris, J. Walter.	Hollywood	13	1
Norris, James J.	Hollywood	14	1
			58 65-100

DORCHESTER COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Bond, Maria L.	Cambridge	1	1 3-4
Booze, Robert G.	Hoopersville	2	5
Brannock, Annie L.	Cambridge	3	2 25 P.
Brannock, Edgar	Cambridge	4	4 15 P.
Bloodsworth, R. E.	Cambridge	5	5
Clayton, John W.	Hoopersville	6	5
Collier, Effie M.	Nanticoke	7	5
Creighton, T. H.	Fishing Creek	8	5
Creighton, E. O.	Fishing Creek	9	5
Conway, Harvey H.	Cambridge	10	3 1-2 25 P.
Dashiell, Ed., Jr.	Cambridge	11	10
Elliott, Wm. E.	Nanticoke	12	5
Ewell, Wm. T.	Elliott	13	5
Evans, Jno. W. T.	Elliott	14	5
Foxwell, Wm. W.	Elliott	15	5
Gray, James W.	Elliott	16	5
Gray, Martha	Elliott	17	5
Gray, Bessie	Elliott	18	3 3-4
Gray, James P.	Elliott	19	5
Gray, Cornelius	Elliott	20	5
Gray, Clara E.	Elliott	21	5
Gillis, Allison A.	Salisbury	22	5
Gillis, L. B.	Salisbury	23	5
Gillis, Laura A.	Salisbury	24	5
Hayward, Eliza E.	Cambridge	25	9-10
Hurseman, Charles W.	Elliott	26	5
Hurley, Levin	Vienna	27	5
Hurley, Celia E.	Vienna	28	5
Hurley, Elijah	Vienna	29	5
Hooper, Adelbert	Hoopersville	30	5
Jones, James W.	Elliott	31	5
Jackson, Thomas J.	Baltimore	32	5
Jones, Harvey	Wingate	33	5
Jones, William C.	Bishop's Head	34	5
Keuley, Mary A.	Baltimore	35	5
Kinnamon, W. T.	Elliott	36	5
Lewis, Thomas	Hoopersville	37	5
Moore, Alonza M.	Elliott	38	5
Moore, Alberry H.	Elliott	39	5
Moore, Mary J.	Elliott	40	2 1-4
Moore, Pheby	Elliott	41	1 3-4 20 P.
Moore, Herman W.	Elliott	42	5
Moore, Delma A.	Elliott	43	2 1-2
Muse, Col. W. S.	Cambridge	44	5

Name.	*Address.*	*No.*	*No. of Acres.*
Mace, John	Cambridge	45	10
Mitchell, Robert H.	Cambridge	46	5
Phillips, Luther	Cambridge	47	5
Phillips, Samuel	Fishing Creek	48	3
Phillips, Albanus	Cambridge	49	5
Phillips, J. R.	Fishing Creek	50	2 1-2
Robinson, William F.	Toddsville	51	5
Rippon, Thomas L.	Hoopersville	52	5
Robinson, W.	Toddsville	53	5
Simmons, Maggie L.	Hoopersville	54	5
Simmons, Samuel M.	Hoopersville	55	5
Simmons, Dorinda	Hoopersville	56	5
Simmons, Rufus	Hoopersville	57	5
Simmons, Avalon	Hoopersville	58	5
Seward, Alex., Jr.	Janes	59	5
Spicer, James K.	Taylor's	60	5
Tyler, Mrs. Kate	Hoopersville	61	5
Travers, John E.	Baltimore	62	5
Tyler, W. B.	Hoopersville	63	5
Tyler, James F.	Hoopersville	64	5
Tyler, Samuel M.	Hoopersville	65	5
Travers, Levin F.	Hoopersville	66	5
Turner, Oscar A.	Cambridge	67	5
Turner, Llewella	Cambridge	68	5
Travers, Henry R.	Hoopersville	69	5
Travers, Benj. F.	Fishing Creek	70	5
Vickers, Thomas H.	Taylor's	71	5
Wingate, C. C.	Bishop's Head	72	5
Willey, Sallie E.	Bishop's Head	73	5
Wroten, Levin A.	Cambridge	74	5
Williams, Albert	Nanticoke	75	5
Woodland, Harrison	Bishop's	76	5
Muse, Col. W. S.	Cambridge	77	5
			367 21-40

KENT COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Stevens, R. N.	Baltimore	1	5

QUEEN ANNES COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Golt, Elmer	Kent Island	1	2 88-100
Hoxter, Mary E.	Stevensville	2	5

Name.	*Address.*	*No.*	*No. of Acres.*
Henry, William T.	Stevensville	3	5
Johnson, William E.	Kent Island	4	5
Marvel, James W.	Stevensville	5	2 1-2 2 P.
Tull, Thomas H.	Kent Island	6	3
Tull, George T.	Kent Island	7	4
			27 157-400

ST. MARYS COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Abell, George F.	Leonardtown	1	5
Abell, George C.	Leonardtown	2	1
Adams, Benj. F.	Compton	3	3 1-5
Burch, James	Oakley	4	3 3-4
Buhrman, H. J.	Porto Bello	5	3
Brome, J. Thomas	St. Marys City	6	3 1-2
Brill, Mrs. M. M. E.	Park Hall	7	4 3-5
Burch, John C.	Leonardtown	8	5
Cheseldine, A. F.	River Springs	9	4 3-4
Coad, Edwin J.	Drayden	10	5
Cox, Jos.	Park Hall	11	2
Dunbar, William W.	Ridge	12	3 1-4
Dunbar, William W.	Ridge	13	3 3-4
Dean, John C.	Leonardtown	14	3 1-2
Ewell, Harrison	Leonardtown	15	5
Forestall, John T.	Wynne	16	5
Farr and Grave	Chaptico	17	7
Ford, Edwin H.	Baltimore	18	4
Gibson, Jos. E.	Abell	19	3 1-4
Hyatt, Alpheus	Porto Bello	20	5
Johnson, L. B.	Morganza	21	5
Kennedy, Alex.	St. Marys City	22	5
Morris, Mrs. L. A.	St. Inigoes	23	4 98-100
Hoxter, Charles E.	Drayden	24	2 1-3
Swann, J. Thomas	Piney Point	25	1
Smith, Umphrey	Leonardtown	26	4 1-5
Smith, J. Winfield	Leonardtown	27	1 3-5
Smith, James F.	Porto Bello	28	2 2-5
Sheehand, John F.	Drayden	29	2
Shorter, William	Drayden	30	1 9-10
Taylor, Jesse	Park Hall	31	7-10
Wise, Samuel O.	Leonardtown	32	5
Wood, Charles D.	Wynne	33	2
Williar, Harry D.	Baltimore	34	4 3 4
Yates, Colton	Leonardtown	35	1
			124 31-75

SOMERSET COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Adams, W. J.	Crisfield	1	5
Blades, T. C.	Crisfield	2	5
Baker, Louise T.	Baltimore	3	5
Beauchamp, Vaughn	Upper Fairmount	4	5
Bradshaw, Jacob T.	Crisfield	5	5
Beauchamp, William T.	Inverness	6	5
Bennett, Charles C.	Inverness	7	5
Bennett, Garnett E.	Inverness	8	5
Bennett, E. S.	Inverness	9	5
Bennett, Ada G.	Inverness	10	5
Bennett, George W.	Inverness	11	5
Bennett, Fred. T.	Inverness	12	5
Bennett, W. F.	Inverness	13	5
Byrd, Ruby E.	Crisfield	14	5
Byrd, William E.	Crisfield	15	5
Byrd, Elizabeth	Crisfield	16	5
Bowden, Edw. A. S.	Crisfield	17	5
Cox, Effie K.	Upper Fairmount	18	5
Cox, George A.	Upper Fairmount	19	5
Coulbourn, Jos. E.	Crisfield	20	5
Coulbourn, Jno. W.	Crisfield	21	5
Coulbourn, Annie N.	Marion Station	22	5
Coulbourn, Clark	Marion Station	23	5
Coulbourn, Lottie	Marion Station	24	5
Coulbourn, Julia	Crisfield	25	5
Croswell, Julia A.	Crisfield	26	5
Coulbourn, Lena V.	Crisfield	27	5
Clayton, Sarah A.	Marion Station	28	5
Conner, Eliza J.	Tull's Corner	29	5
Conner, N. T.	Tull's Corner	30	5
Conner, Nathan S.	Tull's Corner	31	5
Coulbourn, Mary E.	Crisfield	32	5
Cox, Maggie	Fairmount	33	5
Cox, John H.	Fairmount	34	5
Cox, Lloyd W.	Fairmount	35	5
Cox, Rena B.	Fairmount	36	5
Cox, Algie B.	Marumsco	37	5
Crockett, Sallie	Crisfield	38	5
Cullen, Arintha J.	Crisfield	39	5
Cullen, James H.	Crisfield	40	5
Cullen, Manie A.	Crisfield	41	5
Chelton, Mary E.	Crisfield	42	5
Chelton, W. S.	Landonville	43	5
Coulbourn, B. Car.	Crisfield	44	5

Name.	*Address.*	*No.*	*No. of Acres.*
Coulbourn, William H.	Crisfield	45	5
Coulbourn, Jennie E.	Crisfield	46	5
Crockett, Lillian J.	Crisfield	47	5
Cochrane, Arthur B.	Crisfield	48	5
Cochrane, Amy	Crisfield	49	5
Carson, Elsie	Crisfield	50	5
Crockett, Ananias	Crisfield	51	5
Crockett, Marion	Crisfield	52	5
Crockett, Abdengo	Crisfield	53	5
Coulbourn, Isaac	Crisfield	54	5
Cox, William H.	Marumsco	55	5
Cox, Henrietta	Marumsco	56	5
Dayton, Cora	Mt. Vernon	57	5
Dayton, Millard F.	Mt. Vernon	58	5
Daugherty, E. T.	Crisfield	59	5
Dorman, George E.	Crisfield	60	5
Daugherty, G. L.	Crisfield	61	5
Daugherty, Grace	Crisfield	62	5
Evans, William W.	Crisfield	63	5
Evans, Maggie S.	Crisfield	64	5
Evans, Wallace C.	Crisfield	65	5
Ford, Hersehel	Upper Fairmount	66	5
Fisher, William	Mt. Vernon	67	5
Gillis, Joshua	Upper Fairmount	68	5
Gillis, Sara A.	Upper Fairmount	69	5
Gibson, Benj. F.	Crisfield	70	5
Gibson, William E.	Crisfield	71	5
Gray, James M.	Marumsco	72	5
Gunby, Emma	Marion Station	73	5
Gunby, Paul	Marion Station	74	5
Hall, W. C.	Crisfield	75	5
Hall, I. Henry	Marion Station	76	5
Henderson, Mary E.	Princess Anne	77	5
Holland, Mary E.	Crisfield	78	5
Jones, Robert H.	Upper Fairmount	79	5
Johnson, John	Crisfield	80	5
Jackson, Wesley	Marion Station	81	5
Jones, Amanda	Marion Station	82	5
Jones, George	Marion Station	83	5
Landon, Virginia	Upper Fairmount	84	5
Long, A. A.	Marumsco	85	5
Landon, Walter G.	Baltimore	86	5
Landon, William R.	Upper Fairmount	87	5
LaVallette, Amy	Crisfield	88	5
Lawson, Elijah S.	Crisfield	89	5
Layfield, Mary P.	Upper Fairmount	90	5

Name.	*Address.*	*No.*	*No. of Acres.*
Layfield, George W.	Upper Fairmount	91	5
Long, Warren B.	Crisfield	92	5
Long, Susan O.	Crisfield	93	5
Long, Frank P.	Crisfield	94	5
Long, Marion H.	Crisfield	95	5
Lawson, John H.	Lawsonia	96	5
Long, George W.	Crisfield	97	5
Muir, William L.	Oriole	98	5
Mister, Lawson	Shelltown	99	5
Miles, Edwin E.	Marion	100	5
McDaniel, Mathias J.	Oriole	101	5
Miles, Southey F.	Marion Station	102	5
Miles, Luther T., Sr.	Marion Station	103	5
Miles, William S.	Marion Station	104	5
Muir, Mary E.	Crisfield	105	5
Mills, Charles O.	Crisfield	106	5
Mahoney, Sallie	Hopewell	107	5
Morris, Frank H.	Marion Station	108	5
Milbourn, Elizabeth	Marion Station	109	5
Milbourn, Arthur	Marion Station	110	5
Merrill, Samuel	Marion Station	111	5
Maddox, Fred. S.	Marumsco	112	5
Nelson, Elijah W.	Crisfield	113	5
Purnell, Isaac J.	Crisfield	114	5
Pruitt, John E.	Crisfield	115	5
Peyton, Eva B.	Lawsonia	116	5
Peyton, Orrie F.	Lawsonia	117	5
Quinn, Clara H.	Crisfield	118	5
Quinn, Egbert T.	Crisfield	119	5
Quinn, Katie E.	Crisfield	120	5
Quinn, Larie C.	Crisfield	121	5
Riggin, Horace	Crisfield	122	4 30 P.
Riggin, Elisha T.	Crisfield	123	4 3-4 11 P.
Robertson, S. H., Jr.	Westover	124	5
Riggin, Charles E.	Crisfield	125	5
Riggin, Geo. C.	Crisfield	126	5
Riggin, Laura V.	Crisfield	127	5
Richardson, Ruth	Marion Station	128	5
Richardson, N.	Marion Station	129	5
Sterling, William C.	Crisfield	130	5
Scott, Vida A.	Mt. Vernon	131	5
Scott, Lucy V.	Mt. Vernon	132	5
Somers, Henry	Inverness	133	5
Sterling, Ida	Crisfield	134	5
Sterling, Lillie	Crisfield	135	5
Sterling, Roy	Crisfield	136	5

Name.	*Address.*	*No.*	*No. of Acres.*
Sterling, Lenore	Crisfield	137	5
Sterling, I. T.	Crisfield	138	5
Sterling, John	Crisfield	139	5
Sterling, Cornelius	Crisfield	140	5
Sterling, Martin L.	Baltimore	141	5
Somers, E. W.	Champ	142	5
Somers, G. A.	Champ	143	5
Somers, Wm. J.	Champ	144	5
Somers, C. N.	Champ	145	5
Smith, Loretta	Oriole	146	5
Shockley, Leslie	Oriole	147	5
Smith, John W.	Oriole	148	5
Sterling, Mary F.	Crisfield	149	5
Sterling, Arthur	Crisfield	150	5
Sterling, Adelia	Crisfield	151	5
Sterling, C. C.	Crisfield	152	5
Stevens, F. J.	Crisfield	153	5
Sterling, Elwood	Crisfield	154	5
Sterling, Annie R.	Crisfield	155	5
Sterling, Daisy	Crisfield	156	5
Sterling, Agnes L.	Crisfield	157	5
Stevens, Isaac S.	Crisfield	158	5
Sterling, Warren F.	Crisfield	159	5
Seltzer, Edq. L.	Shelltown	160	5
Tull, Washington L.	Crisfield	161	5
Travers, Isaac H.	Crisfield	162	5
Taylor, Emma I.	Tull's Corner	163	5
Tyler, George	Crisfield	164	5
Tull, Ira R.	Crisfield	165	4 3-4
Tyler, Grace	Crisfield	166	5
Tawes, Addie B.	Crisfield	167	5
Tawes, Grace	Crisfield	168	5
Tawes, Isaac H.	Crisfield	169	5
Tull, E. W.	Nanticoke	170	5
Tull, Carrie E.	Nanticoke	171	5
Tull, Robert J.	Crisfield	172	5
Taylor, Rose	Marion Station	173	5
Williams, Benj. F.	Tull's Corner	174	5
Waters, Edw. J.	Marion Station	175	5
Ward, Aletha A.	Marion Station	176	5
Ward, George F.	Marion Station	177	5
Whittington, Mary	Marion Station	178	5
Whittington, A. A.	Marion Station	179	5
Whittington, C. A.	Marion Station	180	5
Whittington, S. F.	Marion Station	181	5
Wharton, Sallie J.	Crisfield	182	5

Name.	*Address.*	*No.*	*No. of Acres.*
Denison, B. W.	Tyaskin	183	5
Bozman, Mary A.	Champ	184	5
Bozman, Thomas A.	Champ	185	5
Lockerman, C. A.	Crisfield	186	5
			926 7-8

TALBOT COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Anderson, Charles H.	Easton	1	5
Bringman, Herman	Oxford	2	5
Bayard, G. Oscar	St. Michaels	3	5
Burrows, Mary E.	Royal Oak	4	1
Bratt, Samuel W.	Easton	5	3 4 P.
Cross, A. E.	Baltimore	6	1 5-8
Collins, Mrs. S. W.	Oxford	7	4 3-4 10 P.
Collins, Herbert E.	Oxford	8	4 7-8
Callahan, Geo. E.	Easton	9	1 27 P.
Dawson, L. G.	Oxford	10	5
Dorrance, John M.	Easton	11	5
Dorrance, Ada K.	Easton	12	2 66-100
Dorrance, Nellie	Easton	13	4 20-100
Easter, Mrs. M. W.	Royal Oak	14	2 28-79 100P
Frampton, Charles L.	Royal Oak	15	5
Fairbanks, Charles E.	Easton	16	5
Glasscock, Dr. A. B.	St. Michaels	17	5
Glasscock, Anna L.	St. Michaels	18	5
Gibson, Mary K.	Easton	19	3 69-100
Howeth, C. E.	Tilghman	20	5
Howeth, Charles J.	Tilghman	21	5
Henderson, Charles E.	Easton	22	3 1-4 19 P.
Henderson, C. E., Jr.	Easton	23	3 32 P.
Henderson, Ida M.	Easton	24	3 1-4
Haddaway, Alex.	Claiborne	25	1 1-4 33 P.
Harrison, C. H. H.	Valliant	26	5
Leonard, D. B.	Oriole	27	5
McConnell, Rev. S. D.	Easton	28	5
McConnell, Anna B.	Easton	29	5
Martin, Francis S.	Easton	30	2 3-4 9 P.
Misner, Albert T.	Tilghman	31	5
Pepper, P.	Bellevue	32	1 1-4 37 P.
Plummer, M. T.	Oxford	33	2 1-4
Pastorfield, W. T.	Royal Oak	34	5
Pearson, H. H., Jr.	Baltimore	35	5
Pearson, H. H., Jr.	Baltimore	36	4 1-2 27 P.

Name.	*Address.*	*No.*	*No. of Acres.*
Rollins, Thornton	Baltimore	37	2 59-100
Rivers, Arthur D.	Baltimore	38	5
Rivers, Janet B.	Baltimore	39	5
Rivers, L. Lucas	Baltimore	40	5
Sinclair, E. W.	Tilghman	41	4 1-6
Smith, W. I., Sr.	Easton	42	5
Valliant, Hugh B.	Valliant	43	5
Valliant, Annetta	Bellevue	44	5
Neuman, Bessie E.	Bellevue	45	2 1-2 21 P.
Valliant, Lloyd N.	Valliant	46	5
Valliant, W. H.	Valliant	47	5
Warfield, Frank	Easton	48	5
		195	1861-2400

WICOMICO COUNTY.

Name.	*Address.*	*No.*	*No. of Acres.*
Adkins, Fred. P.	Salisbury	1	5
Adkins, Elijah S.	Salisbury	2	5
Collins, Lambertine	White Haven	3	5
Covington, James K.	Tyaskin	4	2 1-8
Cox, William B.	Nanticoke	5	5
Dickerson, S. T.	Jesterville	6	5
Evans, Robert G.	Salisbury	7	5
Hopkins, John T.	Victor	8	5
Hopkins, George W.	Victor	9	5
Hopkins, George J. C.	Victor	10	5
Leatherbury, W. K.	Salisbury	11	5
Turner, Alice P.	Nanticoke	12	3
White, Samuel M.	White Haven	13	5
Williams, Elmer C.	Salisbury	14	5
White, Samuel E.	White Haven	15	4
White, Matilda E.	White Haven	16	5
Williams, L. E.	Salisbury	17	5
Williams, Thomas H.	Salisbury	18	5
		84	1-8

OYSTER STEAMER "H. C. ROWE & CO."
EQUIPPED WITH 6 DREDGES. CAPACITY 8,000 BUSHELS PER DAY IN WATER 40 FEET DEEP. ONE OF SEVERAL OYSTER STEAMERS OWNED BY H. C. ROWE & CO., CONNECTICUT, FOR PLANTING, CULTIVATING AND GATHERING OYSTERS FROM PRIVATE OYSTER FARMS

RECOMMENDATIONS.

INTRODUCTION.

Fulfilling the important obligation imposed upon it by Section 119 of the Haman Oyster Culture Law, the Com-

> "SECTION 119. The said Commission shall also in its report make such recommendations as it may deem proper concerning further legislation or changes in the present oyster laws, and shall present the said report to the General Assembly of Maryland."

mission recommended to the General Assembly of Maryland of 1908 that certain changes be made in the law.

These recommendations were made in the light of the results of two years experience in carrying out the provisions of the law. They were the result also of a careful study of the conditions under which industries in oyster culture have been successfully developed in other states and of the information and views received from the discussion of the problem with oyster planters and other citizens of Maryland interested in the subject.

The object of some of the changes recommended was to perfect the provisions under which the survey of the natural oyster bars is made and to lessen the expense of this work to the State but the object of others was to provide conditions vitally important to the measure and without which, it is the belief of the Commission and the friends of oyster culture, a satisfactory industry in oyster culture in Maryland will never be developed.

Although reasons which seemed good and sufficient to the Commission were given for each change recommended, the Legislature did not see fit to make any change in the law. As a result the Commission finds it difficult to lease the barren bottoms open for lease or to collect rents due on lots hitherto leased.

The members of the Legislature of 1908 who voted against the bill as amended by the Commission may be divided into two classes; the first including those who were uncompromising opponents of the Haman Oyster Culture Law, the

second, those who were in favor of the law but who were not sufficiently familiar with the conditions essential to the success of oyster culture to be able to decide between the positions taken by their colleagues and by the Commission.

Some of the members of the first class gave no other reason for their opposition to the amendments recommended by the Commission than that *by adopting them the success of the measure would be assured.*

The reasons given by those of the second class are:

1st. That the law after two years trial has failed to produce the revenue promised for good roads.

2nd. That there is no apparent demand from practical oyster planters for the changes recommended by the Commission.

3rd. That some of the amendments if adopted would seem to provide a condition under which dishonest lessees of barren bottoms may dredge on the natural bars near their leased lots.

Replying to these objections it may be said that two years is a period much too short in which to expect an undeveloped industry to yield a large revenue even under conditions most favorable to its growth. At the time the Legislature of 1908 was in session the barren bottoms of one county only, Anne Arundel, had been thrown open for lease and it will be at least four years from that date before the entire area available for oyster culture within the State will have been opened for lease. Until all of the bottoms suitable for oyster culture in all of the tide-water counties of the State have been thus opened it will be too soon to condemn the law as unproductive of revenue. An obstacle in the way of the rapid development of an industry in oyster culture, even greater than the defects in the law which the Commission is seeking to have removed, is the absence of a fixed policy on the part of the State with reference to the industry. Neither labor nor capital are willing to invest in an enterprise which is likely to suffer from adverse legislation.

Should the State deliberately refuse to perfect its laws on the ground that it is unable to protect itself against criminals (the idea contained in the objection last enumerated), it would forfeit the respect of the civilized world. Thoughtful law-abiding citizens of Maryland cannot possibly entertain and be guided in their action by such an objection. The number of men who will take out leases for lots for the purpose of

using such lots as bases for dredging on natural bars adjacent to them are few and their crime is one that should not be difficult to detect.

RECOMMENDATIONS.

The Commission, more firmly convinced than ever that changes must be made in the law before it will accomplish that for which it was enacted, again presents recommendations and it respectfully insists that its recommendations should be accepted or that other Acts be substituted which will supply the needed conditions as well or better than will be done by the legislation recommended.

Three of the recommendations now offered are the same, with a slight change in one, as three of those offered to the General Assembly of 1908.

The fourth is made in response to a general demand from oyster planters and from prospective lessees of barren bottoms, for a reduction in the rent charged by the State for the use of barren bottoms. This demand seems to be justified by the experience of other states during the developing period of their oyster culture industries. It will be time for an increase in the rents charged for the use of barren bottoms when the industry has become firmly established in Maryland and when the latent possibilities of the barren bottoms of the State for producing oysters have been demonstrated. The development of the industry is being retarded at the present time by the gradually increasing rents.

The fifth recommendation is for legislation quite as much needed for the ultimate success of the law as that contemplated in the amendment referred to in the preceding paragraph. It is intended to provide means by which the payment of rents for the bottoms actually used for oyster culture may be enforced.

The sixth and seventh recommendations aim at shortening the periods during which land owners, oystermen and boatmen may exercise priority in leasing barren bottoms opened for oyster culture and to make it possible for non-residents of the State to lease such bottoms as may remain open for lease after an opportunity to lease them has been offered to all citizens.

The recommendations offered to the General Assembly of 1908 which had for their object the perfecting of the con-

ditions under which the survey of the natural oyster bars is made and the reduction of the cost of the survey, are withdrawn because the survey will have been four-fifths completed before the General Assembly of 1910 will have convened.

SEED OYSTERS.

On March 28, 1907, in accordance with the provisions of Section 111 of the Haman Oyster Culture Law, the Commission passed an order designating the section of the Bay containing a part of the public oyster grounds, known as "The Lumps," for the purpose of supplying seed oysters to persons engaged in planting or cultivating oysters on grounds leased for this purpose from the State, and prescribing such regulations as were deemed necessary to prevent the oysters taken from the section designated, during the period from April 15-May 15, being sold or used for purposes other than planting on bottoms leased from the State.

This order was communicated to the Board of Public Works on April 5, with a request that the Commander of the State Fishery Force be instructed to detail one or more police boats to patrol the waters of the section designated to prevent violations of the provisions of the order.

In designating a police boat to patrol the waters of the section set apart for taking seed oysters for planting purposes, the Commander instructed the captain of the police boat to see that the provisions of the Cull Law were not violated by those who resorted to the section for the purpose of securing seed oysters.

As a result of these instructions, upheld by an opinion of the Attorney-General rendered May 2, the object of the order passed by the Commission was defeated and no seed oysters were secured by planters from the section designated.

The Commission, prior to passing its order, studied the seed-oyster question carefully and, in designating the section containing "The Lumps" for the purpose of supplying planters with seed oysters, it is of the opinion that it not only acted within the bounds of the authority conferred upon it by the Haman Oyster Culture Law, but that in its action no injury whatever was inflicted to the interests of those who depend upon the natural oyster bars of the State for a livelihood.

According to reports by dredgers familiar with the condition of "The Lumps" at the time the order was passed, an abundance of oysters under 2½ inches in length were to be found, with but a very small proportion of marketable oysters among them.

It is the opinion of the Commission that the section of the Bay under consideration is one in which the quantity of oysters which grow to marketable size will never be large, although one in which small oysters will frequently be exceedingly numerous. This opinion is based upon the testimony of persons who have long been familiar with conditions as they have existed in the past on "The Lumps" and upon conditions as they now exist and are likely to exist in the future. During the spring when the Susquehanna and other rivers at the head of the Bay pour a volume of fresh water into the Bay such that the water over "The Lumps" becomes fresh and remains so for several days, many of the oysters in that section are killed. Freshets of such duration as to kill oysters, while not of regular annual occurrence on "The Lumps," are sufficiently frequent to prevent the growth of mature oysters in abundance.

The condition of the shells on these bottoms and the velocity of the tidal currents over them during the oyster spawning season are such that an abundant set of young oysters usually takes place each year.

In view of these conditions and the fact that until an industry in raising seed oysters has been developed in the State, those who lease ground from the State for the purpose of cultivating oysters need small oysters with which to seed their grounds, the Commission recommends that its former order, printed below, be made operative.

ANNAPOLIS, MD., March 28, 1907.

It is ordered by the Board of Shell Fish Commissioners of Maryland, this 28th day of March, 1907, that pursuant to the provisions of Section 101 of Chapter 711 of the Acts of Assembly of 1906, the following area is set aside for the purposes mentioned in Section 111 of said Act, that is to say, all that part of the Chesapeake Bay lying beyond the territorial boundaries of the respective tidewater counties adjacent thereto, which is situated north of a straight line drawn from the point on the Western shore of the bay, known as Bodkin Point, to a point on the Eastern Shore of the bay, known as Swan Point, excluding the whole of Swan Point bar.

1. Any tongman licensed for the oyster season of 1906-1907 may tong, between the 15th day of April and the 15th day of May, 1907, for oysters in the above

mentioned area. The oysters so tonged shall be culled within the area hereby set aside for the purpose of excluding all shells, which must be thrown overboard within said area upon the natural rocks from which they were taken. All oysters valuable for planting purposes, however, may be removed or taken during the period aforesaid whether above or below 2½ inches in length.

2. No boat shall be permitted to leave the area above mentioned with a cargo, or part of a cargo of oysters, on board, unless the captain, or other person in charge of the same, shall exhibit to the commander of the police boat patrolling the said area, a contract of purchase for the oysters so mentioned, signed by one or more of the lessees of land in the State of Maryland leased for oyster culture under the provisions of Chapter 711 of the Acts of 1906. A list of said lessees shall be furnished by the Clerk of the Shell Fish Commission to the commander of the police boat, or boats, patrolling said area.

3. No boat having a dredge or scrape on board shall be allowed to take oysters in the area above mentioned.

ACREAGE OF LOTS FOR LEASE.

The Commission holds the opinion that, after the natural oyster bars and crabbing bottoms have been surveyed and charted and thus excluded from lease, the interests of oystermen and crabbers will not be placed in jeopardy by increasing the acreage of barren bottoms which may be leased for the purposes of oyster culture, and it therefore recommends that the area which may be leased for this purpose in the territorial limits of the counties be increased to 30 acres and in the waters beyond the territorial limits of the counties to 500 acres.

Oyster lots of the acreage now allowed if located near shore can be cultivated and protected without great expense to lessees, but if located in the open waters of the Bay and sounds, large seaworthy boats will be required for the work of both planting and policing and the cost of such boats and the expense of equipping and maintaining them is so great as to make oyster culture on a small scale in such localities unprofitable.

The above recommendation is based upon the fact just stated and the further fact that much of the bottom suitable for oyster culture thus far opened for lease is located in the bold waters of the Chesapeake Bay, Pocomoke and Tangier Sounds.

DREDGING ON LEASED LOTS.

Section 112 of Haman Oyster Culture Law has been interpreted by some to mean that dredging or scraping operations cannot be carried on on lots leased for oyster culture situated in districts designated for tonging operations, but that planted oysters in such districts can be removed with tongs only.

Other legal authorities, among whom is the present Attorney-General, are of the opinion that the existing law places no restrictions whatever upon lessees of barren bottoms as to the time or manner in which planted oysters may be gathered.[1] If this latter opinion should be sustained by the courts there will be no need for further legislation on this subject, otherwise the ambiguity of Section 112 should be removed.

Much of the barren bottom in Anne Arundel and Somerset counties best adapted for oyster culture is located in districts set aside for tonging operations and will not be leased for oyster culture until planters are unrestricted in the methods to be employed in planting and cultivating oysters.

Tonging operations, as a method of removing oysters from the bottoms on which they grow, are very slow, as may be seen by reference to the part of this report (page 14) in which the areas are given which it is possible for tongmen to cover during a period of one hundred days of eight hours each, and it cannot be expected that planters will lease bottoms for oyster culture when the entire amount of time which is available for the work of planting and cultivation is needed for gathering oysters. Planters should be able to place their oysters on the market when prices are best and when their oysters are in marketable condition and this cannot be done when tonging is the only method by which they may be gathered.

The objection raised by oystermen against permitting the use of scrapes or dredges on private grounds in tonging districts is that planted grounds situated near natural oyster bars will be made bases from which illicit dredging operations will be carried on on the natural bars.

[1] See opinion printed on page 146.

Believing, however, that planters may be unrestricted in the methods employed by them in gathering oysters from planted bottoms without thereby endangering the interests of oystermen on the natural bars, the Commission recommends that the right to plant, cultivate and gather oysters from lots leased in any part of the State, by any means whatsoever and at any time whatsoever, be granted, and that severe penalties be provided for dredging or otherwise taking oysters by planters beyond the limits of their private lots.

EXTENSION OF PERIOD FOR PAYMENT OF ONE DOLLAR RENTALS.

After a careful consideration of conditions which have attended the establishment of Oyster Culture in Maryland since the passage of the Haman Oyster Culture Law by the General Assembly of 1906, and in response to a demand among oyster planters for a reduction of rentals charged by the State for the use of barren bottoms, until, at least, a reasonable opportunity has been accorded those who have, or may hereafter become engaged in Oyster Culture, to demonstrate the wisdom of such a policy in Maryland; the Commission recommends that the provision of Section 98, under which the rate of rentals gradually increases until a maximum of five dollars per acre is reached on the sixth year of the lease, be suspended for a period of six years, dating from April 1st, 1910, on all leases which have heretofore, or which may hereafter be made, to the end that all rental charges to April 1st, 1916, shall be fixed at the rate of one dollar per acre per annum.

COLLECTION OF RENTS.

It was supposed by the framers and advocates of the oyster culture law that the demand for oyster lots would be so great and the need by oyster planters for the protection afforded by the State would be so pressing that little difficulty would be found in leasing the grounds open for lease or in collecting rents for the use of the same. The only provision, therefore, made in the law by which the Commission may enforce the payment of rent is that contained in Section 98, which reads as follows:

> SECTION 98. If any part of the rent reserved under such leases shall remain unpaid for more than six months, after the same becomes due, *such lease or leases shall be declared void,* and the land shall revert to the State, and may be leased again in accordance with the provisions of this Act. . . . . .

It now appears that this provision is inadequate and that some more effective method must be provided whereby the State may lease ground and collect rents. A very considerable number of lots are now held and used for oyster planting purposes by planters who pay no rent to the State. Some of these lots have been surveyed, records have been made of the surveys and leases have been issued to the holders but others are being held and used without any formality having been entered into between the holders and the State. The opposition to oyster culture is not sufficiently strong in certain communities to compel planters to secure the protection of the State by complying with the provisions of the law.

The State, having expended a considerable sum in perfecting the conditions under which oyster culture may be successfully carried on, should now take the necessary steps to prohibit the use of ground for oyster culture by persons who do not hold leases to the ground or who are delinquent in the payment of rent and the Commission recommends that an Act be passed under which compliance with all of the provisions of Section 98 may be enforced.

PRIORITIES IN LEASING.

In order to hasten the day when the development of an industry in oyster culture may be begun on all of the barren bottoms available and suitable for oyster culture, the Commission recommends that the lengths of the periods during which land owners, oystermen and boatmen have the prior right, under Section 100, to take out leases to barren bottoms, be reduced; the prior right of land owners to lease being made to extend over a period of thirty days instead of four months; that of oystermen and boatmen being made to extend over sixty days instead of six months.

Land owners, oystermen and boatmen are in positions to ascertain the location and character of barren bottoms in a very short time after they have been opened for lease, and the rights of these citizens will not be affected by shortening the time during which they may select such ground as they may desire to take up.

The particular result aimed at by shortening the above periods is that members of the general public may become lessees of barren bottoms for oyster culture within three months instead of ten months after the date of opening barren bottoms for lease.

NON-RESIDENTS OF THE STATE.

Under the provisions of the Haman Oyster Culture Law bona fide residents of the State of Maryland only may lease grounds for oyster culture.

It is possible, however, that when citizens of the State shall have leased such bottoms as they desire to cultivate, some of the bottoms available and suitable for oyster culture will yet remain an open and unproductive common.

The Commission therefore recommends that such bottoms available for oyster culture as may not be leased to citizens of the State within two years from the date of opening such bottoms for lease, be opened for lease for oyster culture to non-residents of Maryland.

CONCLUSION.

As the survey of the vast area of Natural Oyster grounds beneath the tide waters of the State approaches completion, it is the opinion of the Commission that the area exclusive of the natural oyster bars, beneath the waters of Maryland, which may ultimately be brought under a state of profitable oyster culture, will approximate 350,000 acres.

Of this latter area, it may be conservatively stated that about 100,000 acres is first-class oyster land, and will be readily leased by those desiring to engage in the business of bedding and planting oysters, as soon as the Haman Oyster Culture Law is so amended as to cover such omissions as the practical operations of the law have seemed to demand, since its enactment in 1906.

When it is considered by high authorities that the Chesapeake Bay and its many tributaries furnish some of the best oyster producing area in the United States, and when it is admitted that at least 100,000 acres of bottom, as above stated, can be made productive with comparatively slight expense, it is apparent to those who have given the subject careful

thought, that the Oyster industry of Maryland, when properly fostered through practical legislation, will become one of the best and surest resources of the State.

It should be remembered that the enemies of oysters, such as Star Fish, which destroy large quantities in the waters of certain other States, exist to a very small extent in the Chesapeake Bay and tributaries; and the further fact should not be forgotten, that oysters in Maryland waters will attain a given size in about three fifths of the time required for their growth in Northern Waters.

For the purpose of permanently establishing the boundaries of the Natural Oyster Bars within the waters of the State, as well as of putting into effect the operations of the Haman Oyster Culture Act, the Legislatures of 1906 and 1908, have appropriated the aggregate sum of $127,200. Of this sum about $11,000 remains in the treasury of the Commission at the close of field work for the season of 1909, in addition to permanent fixtures and equipments of the estimated value of $12,000. It will be seen, therefore, that the approximate cost of the work as so far accomplished, represents an expenditure of $104,200. From this outlay there has already accrued to the State a net revenue of $15,578.82, representing the receipts from Application, Recording, Survey and Rent fees, less the actual costs of collecting the same.

In another year the survey of the remaining waters of the State will have been fully completed, and the consequent outlay incident to this important work will have been checked. It is then confidently believed, especially if the amendments to the present Oyster Culture Law, as hereinbefore proposed, are adopted by the General Assembly of 1910, that an annual revenue greatly in excess of expenditures necessary to the execution of the law, and gradually increasing as the policy of Oyster Culture becomes fixed in the State, will be assured to the State in return for its original investment above indicated.

A foundation will thus be laid for an oyster industry far greater than that which has existed heretofore in this State, and such a result can be accomplished also without injury either to the natural bars, or to the farms.

There can be no reasonable doubt that a substantial net revenue can be realized for the State from rentals which can be fairly demanded for the use of its valuable oyster lands, and it is the earnest trust of the Commission that an enlightened public sentiment which finally chrystalized in the enactment

of the original oyster culture legislation of 1906, will prevail in the General Assembly of 1910, to the extent of granting such amendments as will subject that legislation to a fair and impartial test, both as to the foundation of a greater oyster industry in the State, and as a means of greatly increasing its revenues.

FINANCIAL STATEMENT.

APPROPRIATION, RECEIPTS AND DISBURSEMENTS OF THE SHELL FISH COMMISSION.

October 1st, 1908.

RECEIPTS.

September 30th, 1907—Balance on hand	$ 1,830.05
October 1st, 1907—General Appropriation under Chapter 253 of the Acts of 1908, for year 1907 to 1908	25,000.00
Salaries of Commissioners and Chief Clerk under Chapter 253 of the Acts of 1908	6,800.00
October 1st, 1908—Application Fee Fund	315.00
October 1st, 1908—Record Fee Fund	540.00
October 1st, 1908—Rent Fund	3,612.05
October 1st, 1908—Survey of Oyster Lots	20.00
	$ 38,117.10

DISBURSEMENTS.

1908.		
Oct.	Houseboat Oyster	$ 940.88
	Postage, expressage and incidentals	634.01
	Buoys and boats	995.40
	C. & P. Telephone Company	67.90
	Advertising, printing and office supplies	1,359.57
	Salaries of Commissioners	5,600.00
	Salary of Swepson Earle	2,500.00
	Salary of Chief Clerk	1,254.84
	Salaries of assistant clerks and stenographer	2,258.30
	Scientific and engineer supplies	289.54
	Expense of Commissioners	908.65
	Jamestown Exposition exhibit	35.75
	J. F. Robrecht (local oysterman for St. Marys County, 1908)	60.00
	H. L. D. Stanford, attorney for Tangier Pk. Co	225.00
	James A. Duke (local oysterman for Calvert County)	180.00
	Thos. S. Daugherty (local oysterman for Somerset County)	15.00
	Labor	[illegible]
	Subsistence	3,762.91
	Thomas H. Robinson, attorney	750.00
	Salaries of assistant engineers	2,326.15
	H. E. Collins, Surveyor for Somerset County	151.95
	Bills payable	8,000.00
		$ 37,267.01
1908. Oct.	Balance on hand	850.09
		$ 38,117.10

ACTS—JANUARY SESSION, 1906—CHAPTER 711.

AN ACT to establish and promote the industry of oyster culture in Maryland, to define and mark natural oyster beds, bars and rocks lying under the waters of this State, to prescribe penalties for the infringement of the provisions of this Act, and to add new sections to Article 72 of the Code of Public General Laws, to follow Section 82, and to be designated respectively as Sections 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, *and* 119.

SECTION 1. Be it enacted by the General Assembly of Maryland, That the following sections be and they are hereby added to Article 72 of the Code of Public General Laws, title "Oysters," to follow section 82, and to be designated respectively as sections 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, and 119.

SECTION 83. Any resident of Maryland shall have the right to plant and cultivate oysters in the waters of this State; such right shall be exercised in the manner prescribed in the following sections of this Act, and shall be subject to the regulations, provisions and limitations hereinafter set forth, but no corporation, or joint stock company, shall be permitted to lease or take up, or to acquire by assignment, or otherwise, any lands of the State for oyster planting or cultivation. All natural beds or bars shall be excluded from the operation of this Act, and no person shall be permitted to plant or cultivate oysters thereupon, or in any way appropriate the same to his own use.

SECTION 84. The Board of the Shell Fish Commissioners of Maryland is hereby created. The said Board shall consist of three members, one of whom shall be a resident of one of the tidewater counties of the Eastern Shore of Maryland, another a resident of one of the tidewater counties of the Western Shore, and the third a resident of the City of Baltimore, and one of whom shall be a member of the minority party at the time of their appointment. The term of each of the members of said Board shall be two years from the

first Monday in May after his appointment. They shall be appointed by the Board of Public Works of the State of Maryland. No member of said Board of Shell Fish Commissioners shall be in any manner interested in any land leased or taken up for bedding, planting or cultivating oysters. The acts and duties to be done and performed by said Board under this Act may be done and performed by two of said Commissioners, and in all cases, the decision of a majority of the Commissioners shall be binding. One of said Commissioners shall be designated by the Board of Public Works of the State of Maryland as president, and his salary shall be Two Thousand Dollars a year. The salary of the other Commissioners shall be Eighteen Hundred Dollars a year. The said Commissioners shall be allowed to employ a chief clerk upon a salary of Twelve Hundred Dollars a year, and such assistants, not exceeding three in number, and not more than be absolutely needed for the performance of the work of the Board, at graded salaries, to be paid by the Commissioners, not to exceed One Thousand Dollars a year for any such assistants, as it may deem necessary to aid it in the proper performance of its duties, as prescribed in this Act. The said Commissioners shall employ a competent surveyor, who shall also be a hyrographic engineer, upon a salary to be named by said Commissioners not exceeding Twenty-five Hundred Dollars a year. If the Commissioners deem it expedient to employ a hydrographic engineer, who is also a biologist, capable of investigating oyster propagation, an engineer of such qualification may, in their discretion, be employed. The sum of Five Hundred Dollars per annum shall be appropriated, to be expended under the direction of said engineer, if he be a biologist, who shall, in that event, establish one or more stations for said investigation of oyster propagation. All salaries, outlays and disbursements authorized by this Act shall be paid out of the general treasury of the State of Maryland upon requisition made by the Board of Shell Fish Commissioners, endorsed by the Comptroller of the State, but the same shall be repaid out of the first revenues arising from the leasing of land for oyster culture contemplated by this Act. The Commissioners composing said Board shall, immediately after their appointment, file in the office of the Clerk of the Court of Appeals separate bonds, with a surety or sureties to be approved by the State Treasurer, in the sum of Ten Thousand Dollars, conditioned for the faithful per-

formance of the duties imposed by this Act. The said Commissioners shall take and subscribe before the Governor of the State an official oath prescribed by the Constitution. The said Commissioners shall have an office in the City of Annapolis.

Section 85. The Commissioners shall keep, at its office in the City of Annapolis, books of record, in which shall be recorded all leases, assignments and other conveyances of land to be used for the planting or cultivation of oysters in accordance with this Act. A set of clear and simple forms, for all subsequent conveyances of any kind, shall be prepared by the Board, with the advice of the Attorney-General, and no title shall be vested in any lessee or transferee of any interest or estate acquired under this Act until the conveyance or conveyances evidencing such leases or transfers will have been recorded in the office of the Board of Shell Fish Commissioners.

Section 86. The Board of Shell Fish Commissioners shall, as soon as practicable, after the passage of this Act, cause to be made a true and accurate survey of the natural oyster beds, bars and rocks of this State, said survey to be made with reference to fixed and permanent objects on the shore, giving courses and distances, to be fully described and set out in a written report of said survey, as hereinafter required. A true and accurate delineation of the same shall be made on copies of published maps and charts of the United States Coast and Geodetic Survey, which said copies shall be filed in the office of the said Commissioners in the City of Annapolis; and the said Commissioners shall further cause to be delineated upon copies of the published maps and charts of the United States Coast and Geodetic Survey, of the largest scale one copy for each of the counties of this State in the waters of which there are natural oyster beds, bars and rocks, all natural beds, bars and rocks lying within the waters of such county, which maps shall be filed in the office of the Clerks of the Circuit Court for the respective counties, wherein the grounds so designated may lie. The said survey shall be made by the hydrographic engineer employed by said Board, as provided in Section 84 of this Act, acting under the direction and control of the said Commissioners. The said natural beds, or bars, shall be marked by buoys, which shall be known as State buoys.

SECTION 87. The Governor of this State is hereby requested to ask the assistance of the United States Coast and Geodetic Survey, and of the United States Fish Commissioner, to aid in the carrying out of the provisions of the preceding section.

SECTION 88. The County Commissioners of each and every county in this State, in which there are natural oyster beds, bars or rocks, shall be authorized to appoint some resident of their said county, who is well acquainted with the situation and location of oyster beds, bars or rocks in the waters of such county, who shall aid the said Board by furnishing any information he may possess, concerning the situation and location of recognized oyster beds, bars and rocks in the waters of such county, and who shall accompany the said Commissioners and the hydrographic engineer appointed by said Board, but only within the limits of his county, in the making of the survey of the natural oyster beds, bars and rocks, as provided by this Act, the said appointee to receive a compensation of Five Dollars per day when actually so engaged.

SECTION 89. As soon as practicable after the first day of April, 1906, the said Commissioners shall organize and shall at once proceed, with the assistance of such person or persons as may be detailed by the United States Coast and Geodetic Survey, and the United States Fish Commissioner, to aid them in their work, and of such persons as may be appointed under the preceding section, to have laid out, surveyed and designated on the said charts, the natural beds, and bars, and shall cause to be marked and defined as accurately as practicable, the limits and boundaries of the natural beds, bars and rocks, as established by said survey, and they shall take true and accurate notes of said survey in writing, and make an accurate report of said survey, setting forth such a description of land marks as may be necessary to enable the said Board, or their successors, to find and ascertain the boundary lines of the said natural oyster beds, bars and rocks, as shown by a delineation on the maps and charts provided in this Act; said report shall be completed and filed in the office of the Board in the City of Annapolis, within ninety days after the completion of the survey of any county. Said Commissioners shall cause the same to be published in pamphlet form, and transmit copies of the same to the Clerk of the Circuit Court for their respective counties, where the

charts have been filed or directed to be filed, as hereinafter provided; the said report to be filed by the Clerks of the several counties in a book kept for that purpose. And the said survey and report, when filed, subject to the right of appeal hereafter provided for in this Act, shall be taken in all of the Courts of this State as conclusive evidence of the boundaries and limits of all natural oyster beds, bars and rocks, lying within the waters of the county wherein such survey and report are filed, and shall be construed to mean in all of the said Courts that there are no natural oyster beds, bars or rocks lying within the waters of the counties wherein such report and survey are filed, other than those embraced in the survey authorized by this Act, and that all areas of the Chesapeake Bay and its tributaries within the State of Maryland, not shown in the survey to be natural oyster beds, bars or rocks, shall be construed in all the Courts of the State to be barren bottoms, and open for disposal by the State for the purpose of private planting or propagation of oysters thereon under the provisions of this Act; provided that the said survey and report shall not be so construed as to affect in any manner the holdings by citizens of this State in any lot which may have been appropriated or taken up under the laws of this State prior to the approval of this Act.

Section 90. The said Board, in defining the natural beds and bars, shall exercise its judgment liberally in favor of the natural beds and bars, and allow a reasonable margin of the barren bottoms, rather than encroach on a natural bed or bar. The natural beds or bars shall be bounded by straight lines, even though some portions of barren bottoms may thus be necessarily included within such lines.

Section 91. If residents of any county, exceeding twenty-four in number, shall, within four months after the filing of said survey and report in such county, file in the Circuit Court for said county a petition, in writing, attested by the oath of some one or more of the petitioners, alleging that five or more adjacent acres of oyster beds, bars or rocks, in such county, have been omitted from such surveys, or that five or more acres of barren bottoms have been included in such survey and designating the location of same by a plat, or as near as may be with reasonable certainty by such land marks as will locate and designate the beds alleged to have been omitted or included, a Judge of the Circuit Court for the said county, after due notice given to the Board of Shell Fish Com-

missioners, shall proceed to hear testimony and decide the case, as provided in the succeeding section, but this section shall not apply where the ground claimed by the petitioners has been legally taken up prior to the approval of this Act.

Section 92. Upon hearing a case presented by petition under the preceding section, the Judge shall determine the question whether the ground referred to in said petition is a natural bed or barren bottom, and his finding on said question shall be final, and shall be entered upon the records of the Board of Shell Fish Commissioners in their office in the City of Annapolis, and properly marked on the copies of the plat as hereinbefore required.

Section 93. Such amended survey shall be filed in the offices of the Clerks of the Circuit Court for the counties in which the original surveys hereinbefore provided are required to be filed, and when so filed, shall be conclusive evidence in all the Courts of this State as to whether the area embraced therein is or is not a natural oyster bed, bar or rock.

Section 94. Whenever a petition is filed in the Circuit Court for any county, as authorized in Section 91 of this Act, the parties so petitioning shall deposit Twenty-five Dollars, to be returned to the petitioners if the Judge shall determine in favor of the petitioners, but if the Judge shall determine adversely to the petitioners, then said sum to be applied, so far as necessary, to the payment of costs incurred in the proceedings under said petition, and the balance to be returned to said petitioners.

Section 95. The said Board shall be authorized to call to their assistance the County Surveyor of any county, whenever in their judgment his assistance is necessary, and shall pay him for his services such compensation as is authorized by law for his services in other proceedings.

Section 96. The Board of Shell Fish Commissioners shall cause an accurate survey of and delineation upon the maps and charts aforesaid of all bottoms of the tributaries of the Chesapeake Bay where grass grows and it is profitable to scrape for soft shell or shedder crabs, and shall have such bottoms properly designated by permanent objects on the shore, as provided hereinbefore for natural oyster beds, bars and rocks, which said crabbing sections shall be exempt from leasing for oyster culture.

SECTION 97. One of the steamers of the State Fishery Force shall be kept in commission under the command of the Deputy Commander and subject to the control and direction of the Commissioners from the first day of April in each year, until the first day of October following, to assist the Board in the performance of the duties imposed upon it by this Act, and the Deputy Commander in each of the several districts of this State shall also be subject to the control and direction of the said Commissioners during the closed season for the taking and catching oysters with rakes and tongs, during the time the said Commissioners shall be engaged in the respective districts in locating natural oyster beds, bars and rocks, and shall give the said Commissioners every assistance in their power.

SECTION 98. After the survey provided for herein shall have been completed, it shall be the duty of the Board of Shell Fish Commissioners to lease, in the name of the State of Maryland, tracts, or parcels, of land beneath the waters of this State, whether within the limits of the counties, or elsewhere, in the area to be opened for oyster culture, according to the provisions of this Act, provided that no tract so leased, if situated within the territorial limits of any county in this State, shall contain less than one acre of land, and if situated in any other place, no tract so leased shall contain less than five acres. It shall be the duty of said Commissioners to require that the tracts so leased shall be as nearly rectangular as is convenient. It shall be the duty of the said Commissioners to demand from each lessee payment of the rent each year in advance. No person shall be permitted, by lease, assignment, or in any other manner, to acquire a greater amount of land than ten acres situated within the territorial limits of any of the counties, or one hundred acres in any other place. Leases shall be made only to residents of Maryland. The term of such leases shall be twenty years, and the annual rent reserved to the State shall be one dollar per acre for each of the first two years of said term of twenty years; two dollars per acre for the third year; three dollars per acre for the fourth year; four dollars per acre for the fifth year; and five dollars per acre during the remainder of the term. If any part of the rent reserved under such leases shall remain unpaid for more than six months, after the same becomes due, such lease or leases shall be declared void, and the land shall revert to the State, and may be leased again

in accordance with the provisions of this Act. The said Commissioners may at the request of any lessee, if it shall appear equitable so to do, upon the cause shown in writing, cancel his lease as to the whole or a part of the lands leased.

Section 99. In case the survey provided for by this Act shall not have been completed within one year from the passage of this Act, then it shall be the duty of the Board of Shell Fish Commissioners to begin the leasing of barren bottoms in the manner, and upon the terms provided in the preceding section, provided that such leasing shall then commence only in those areas in which the survey provided for in this Act shall have been completed.

Section 100. For a period of four months after the said survey shall have been completed, or after any area shall have been opened to leasing under the preceding sections, citizens of Maryland, residing in any part of the State, who, at the time of the completion of said survey, or at the respective times of the opening for oyster culture of several areas, as the case may be, may be owners of land having a water front upon any part of the said areas so opened to oyster culture, shall have the exclusive right to rent any land opened to oyster planting under the provisions of this Act, adjacent to their lands. And for an additional period of six months, after the expiration of the said period of four months all boatmen, residents of this State, who shall be engaged in the business of dredging, scraping or tonging for oysters at the time of the completion of the said survey, or at the respective times of the opening for oyster culture of several areas, or if said survey shall be completed, or the said areas shall be opened to oyster culture during the closed season for dredging, scraping or tonging, as the case may be, then the persons so engaged at the end of the last dredging, scraping or tonging season, shall have the like exclusive right in the order of their respective application, as the same may be received and opened by the Commissioners, to rent any adjacent lands, provided that in no event shall any such land owner, boatman or any other person, be permitted to rent or acquire more than ten acres, or one hundred acres, as the case may be, dependent upon the situation of the land which is leased or acquired; and provided further, that no such riparian land owner, as is mentioned in this section, shall be entitled to rent the amount of ten acres, or one hundred acres, as the case may be, unless the water front of the land so

owned by him, if fronting on water within the territorial limits of a county, be at least two hundred yards, or if fronting on waters in any other place, be at least seven hundred yards. The owners of land having a less water front than is mentioned above shall be entitled to rent a proportionately less amount of land, dependent upon the length of the front upon water within county limits or elsewhere.

Section 101. Blank forms of application shall be furnished upon reasonable charges, to be prescribed by the Board of Shell Fish Commissioners, to any person desiring the same. All such forms shall be printed and shall be substantially in the following languages: Application for a lease to the Board of Shell Fish Commissioners of Maryland. The Application of....., a resident of.....County, in the State of Maryland, respectfully shows that he is a resident of said State; that he wishes and intends to use the grounds hereinafter described for planting or cultivating oysters. He therefore requests that said Board lease to him, in the name and on behalf of the State of Maryland.....acres of ground located under the waters of the State of Maryland, which ground is more particularly described as follows, to-wit: (Describe here). Dated at....., Maryland, this....day of.....A. D. ....., Applicant.

Section 102. When the period of ten months will have elapsed after said survey shall have been completed, or after the lands beneath the waters of any area shall have been opened to leasing under Section 99 of this Act, the Board of Shell Fish Commissioners shall endeavor to lease the remaining portions of land so open to oyster culture under the provisions of this Act to applicants who shall be residents of Maryland, in the order of their applications as received and opened by said Commissioners.

Section 103. Any person who may desire to plant and cultivate oysters in the area hereinbefore designated shall file with the Board of Shell Fish Commissioners an application substantially in the form prescribed in Section 101 of this Act. The applicant shall indicate plainly the location of the land he desires to lease. The application shall be sworn to before a Justice of the Peace of this State. A fee of five dollars shall be paid by the applicant to the Board of Shell Fish Commissioners at the time of filing the application, which fee shall be returned to the applicant if his application shall be for any reason declined.

Section 104. If such applicant be a resident of the State of Maryland, and if no objections to the issuing of the lease asked for in any such application be filed with the Commissioners within the period of thirty days after such application is made, or as soon as any objection that may have been filed to the granting of such lease will have been finally overruled by said Commissioners, the said Commissioners, upon payment by the applicant of a further fee of two dollars and a half, in addition to the fee of five dollars, which is to accompany his application, shall cause to be entered in a book or books to be known as "The Register of Title to Oyster Lands," the name of the applicant, with concise but clear description of the land applied for. A survey of such land at the expense of the applicant shall be made by the Board before the entry, if, in its opinion, said survey is necessary to an accurate description thereof. The payment of the proper fees due for the application and the record in the register required by this section to be kept, shall constitute between the State and the applicant the relation of landlord and tenant for the term of twenty years, from the record of the lands so applied for as aforesaid, at the annual rentals provided in Section 98 of this Act.

Section 105. The relation of the landlord and tenant, stated in Section 104, shall have all the incidents attaching to that relation as the same exists under the laws of Maryland, excepting only the following particulars: First, the only remedy of the State for non-payment of the rent of oyster lands shall be the strict enforcement of the provisions set forth in Section 98 of this Act. Upon the non-payment of any rent for the time therein mentioned, it shall be the duty of the Board of Shell Fish Commissioners, after a written notice of not less than ten days to the lessee, to declare the lease vacated by stamping the word "Void" in distinct letters across the description in the register; second, land leased under this Act shall be used only for the purpose of planting and cultivating oysters; third, no right shall exist to redeem or purchase any land of the State so leased; fourth, any other modifications caused by the provisions of this Act.

Section 106. The Commissioners shall at once notify the lessee of the record in the register required by Section 104, and the lessee shall, as soon thereafter as practicable, not exceeding thirty days from the receipt of said notice, cause the ground designated as leased to him to be plainly marked out

by stakes, buoys or monuments, under the supervision of the Commissioners. At least four of such stakes, buoys and monuments shall have the initials of the lessee plainly marked upon them, and such stakes, buoys or monuments shall be at all times during the existence of said lease continued by the said lessee or his legal representative.

Section 107. This Act is not intended to apply to any lands owned by private persons, the bounds of which extend below low water into or beneath the waters of this State. This Act shall not be so construed as to apply to any creek, cove or inlet, less than one hundred yards in width at its mouth at low tide.

Section 108. Any person who has, prior to the passage of this Act, lawfully appropriated or taken up any land in this State, for the purpose of planting, bedding or cultivating oysters thereon, may become a lessee of said land for the term of twenty years from the passage of this Act, with all the incidents, including the payment of the rents of the lease contemplated by this Act, provided such person gives written notice to the Board of Shell Fish Commissioners of his intention to become such lessee within six months after the passage hereof. The holding of any person who may have appropriated any such land shall become void and of no effect in law, upon the expiration of the said period of six months from the passage hereof, if no such notice of intention will have been given within said period of six months.

Section 109. The lessee of any land leased for the purpose of planting and cultivating oysters shall have exclusive ownership of and title to all oysters planted by him or existing on the land leased.

Section 110. No assignment or transfer of any interest acquired by this Act shall be valid for any purpose if made to a non-resident of this State. If any such assignment is attempted to be made, all interest of the grantor, or assignor, shall revert to the State as if no lease had ever been made. If any assignment of any interest created by this Act is attempted to be made to any corporation or joint stock company, all the interest of the grantor or assignor shall revert to the State as if no lease had ever been made. If any assignment of any interest created by this Act is attempted to be made to any person in such a way that the assignee shall become the holder of more than ten acres, or one hundred acres, as the case may be, according to the location of land

leased under this Act, all interest of the grantor or assignor, in case of such an assignment, shall revert to the State as if no lease had been made.

Section 111. It shall be lawful for any tonger, between the 15th day of April and the 15th day of May in any year to take oysters from such natural beds or bars in the tonging districts of the Chesapeake Bay and its tributaries, as the Commission may mark out for that purpose, and under such regulations as said Commission may from time to time prescribe; provided, however, that said oysters may be sold only for the purpose now permitted under existing laws of Maryland, during the season of the year above mentioned; and in addition thereto, to persons engaged in the industry of planting and cultivating oysters within the area designated by this Act, the same to be delivered only upon lands which may have been leased under the provisions of this Act for such purposes of planting or cultivating.

Section 112. It shall not be necessary for any holder of oyster land under this Act to take out any license for dredging, scraping or tonging oysters on any land so held by him, and oysters on such land may be taken in any manner and at such times as may be desired by the holder of such land as allowed by the existing laws of this State.

Section 113. Any person who shall wilfully and without authority take or remove oysters from any land leased under the provisions of this Act, or shall wilfully injure or interfere with the oysters of such land in any manner, or injure the oysters thereupon situated, or remove, alter or interfere with the stakes, buoys or monuments marking the same, shall, upon conviction thereof, for the first offense, be sentenced to imprisonment in jail or in the penitentiary, in the discretion of the Court, for not less than three months and not more than two years, and for the second, or any subsequent offense, be sentenced to imprisonment in the penitentiary for not less than two years and not more than five years.

Section 114. Any person who shall work a dredge, scrape or pair of tongs, or any other implement for the taking of oysters upon any land leased under the provisions of this Act without the consent of the lessee or owner, or who shall, while upon or sailing over any such ground or bed, cast, haul or have overboard any such dredge, scrape or pair of tongs, or other implement for the taking of oysters, under any pretense or for any purpose whatever, without the consent of such

lessee or owner, upon conviction thereof, shall, for the first offense, be fined not less than fifty dollars, nor more than two hundred and fifty dollars, in the discretion of the Court, be imprisoned in jail, or in the penitentiary for not less than three months, nor more than one year, or shall be both so fined and imprisoned, and for the second, or any subsequent offense, shall be sentenced to imprisonment in the penitentiary for not less than two years nor more than five years.

Section 115. Any person who shall make his boat fast to a State buoy, or remove the same, or in any manner interfere therewith, the same shall, in the discretion of the Court, upon conviction thereof, be sentenced to the penitentiary for a term of not less than one year or more than two years.

Section 116. In addition to other penalties herein provided, any person convicted of a violation of this Act under either of the three preceding sections, shall be, and is hereby, denied the right to take out any license to dredge, scrape or tong for oysters in any waters of this State, for the period of three years after said conviction.

Section 117. It shall be the duty of all officers and members of the State Fishery Force to arrest persons violating this Act, and to patrol such waters of the Chesapeake Bay and its tributaries as they may be directed by the Board of Public Works to patrol, for the purpose of preventing violations of this Act.

Section 118. The revenues arising from the operation of this Act shall be applied in the following manner: First, to the payment of all salaries, expenses, surveys, outlays and disbursements authorized by this Act; second, the balance, if any, to be paid at the end of each year into the Treasury of the State, leaving, however, a balance at the end of each year of Ten Thousand Dollars with the Board of Shell Fish Commissioners, to be applied to the current expenses of its office for the ensuing year. All moneys so paid as aforesaid into the Treasury of the State shall be placed to the credit of a special fund, called the "Special Road Fund."

Section 119. The Board of Shell Fish Commissioners shall annually prepare and publish in pamphlet form a full report of its transactions during the year prior thereto, as well as a statement of the operations of this Act, and an account of the receipts and disbursements hereunder. The said report shall also contain a detailed statement of the lands leased under this Act, with the names of the lessees. The said Commis-

sioners shall also in its report make such recommendations as it may deem proper concerning further legislation or changes in the present oyster laws, and shall present the said report to the General Assembly of Maryland.

SEC. 2. And be it enacted, That this Act shall take effect from the date of its passage, and all laws of Maryland inconsistent with this Act shall be, and the same are hereby, repealed.

Approved April 2d, 1906.

THE GREAT SEAL OF MARYLAND.

EDWIN WARFIELD,
Governor.

JOSEPH B. SETH,
President of the Senate.

CARVILLE D. BENSON,
Speaker of the House of Delegates.

STATE OF MARYLAND, *Set.:*

I, Thomas Parran, Clerk of the Court of Appeals of Maryland, do hereby certify that the aforegoing is a full and true copy of the Act of the General Assembly of Maryland, of which it purports to be a copy, as taken from the Original Law belonging to and deposited in the office of the Clerk of the Court of Appeals aforesaid.

[SEAL.]

In Testimony Whereof, I have hereunto set my hand as Clerk, and affixed the seal of the said Court of Appeals this 23d day of May, A. D. 1906.

THOMAS PARRAN,
Clerk Court of Appeals of Maryland.

OPINIONS RENDERED BY HON. THOMAS H. ROBINSON, COUNSEL TO THE BOARD OF SHELL FISH COMMISSIONERS.

1. *Jurisdiction.*

Chapter 711 of the Acts of 1906 has no application to the natural oyster beds and bars located in the waters of the State of Maryland, except to provide for their survey and delineation upon maps and charts of the United States Coast and Geodetic Survey of the largest scale and providing a copy for each of the counties of this State in the waters of which natural beds, bars and rocks are located as set forth with great detail in said Act and subject to the right of appeal as therein provided, the action of the Shell Fish Commission shall be conclusive evidence of the boundaries of all natural oyster beds, bars and rocks. All the areas of the Chesapeake Bay and its tributaries and the waters of the State within the State of Maryland not shown in said survey to be natural oyster beds, bars or rocks shall be construed in all the courts of the State to be barren bottoms, and it is with this part of the land owned by the State and covered with water that the Act above referred to applies as well as to land lawfully appropriated or taken up for the purpose of planting, bedding or cultivating oysters thereon as provided in Section 108 of the Act.

2. *Private Ownership and Riparian Rights.*

One of the questions of considerable interest to land owners bordering on the waters of the State is as to the extent of their rights on the shore. Section 107 of this Act provides that it is not intended to apply to any lands owned by private persons the bounds of which extend below low water into and beneath the waters of the State, it being the intention of the Act to protect the rights of land owners under old grants from the State prior to 1862 who may have acquired the right from the State to any land covered by navigable water. It is believed that the extent of this private ownership is very small, but whenever it does exist and the title can be established, the rights of the owner are exempt from the operation of this

Bill to the extent of their holdings. Chapter 129 of the Acts of 1862 expressly prohibits the right to issue any patent to land covered by navigable water, and the rights of land owners bordering on the shore of the navigable waters of the State, with the possible exception above referred to, extend to high-water mark and the land covered by water within the ebb and flow of tide to high-water mark belongs to the State and is the subject of lease under the provisions of this Act.

Another question of interest akin to this is where a tract of land lies adjacent or contiguous to a navigable river or water, as to the interest of the owner of the land in any change in the shore line and the rule adopted by the Commission which is in conformity with the decision of the Courts is that any increase of soil gained from the sea either by alluvion, the washing up of sand and earth so as in time to make terra firma, or by dereliction, as where the sea shrinks back below the usual water mark, in these cases it is held that if this gain be little and little by small and imperceptible degrees it shall go to the owner of the land adjoining, and that the ownership of land may be lost by erosion or submergence, the one consisting of the gradual eating away of the soil by the operation of currents and tides and the other by its disappearance under the water and the formation of a navigable body over it, and the reason for the rule allowing the owner of the land to claim all that is acquired by alluvion or dereliction is to make up for the possible losses he may sustain by the sea encroaching upon his holdings. In one case brought to the attention of the Commission a grant of 2,000 acres of land under a patent issued in 1867 was found by a recent survey to contain only 1,850 acres, the waters on the shore of this property having by imperceptible degrees encroached on the owners during that long period until one hundred and fifty acres of land was apparently under the navigable waters of the State, and it was held that the owners' rights could not extend below high-water mark as it now exists.

RIGHT OF LOT HOLDERS TO TAKE UP PLANTED OYSTERS.

The rights granted by Section 112 of the Acts of 1906 to lessees of ground for the purposes of oyster culture, is a subject about which there is such wide differences of opinion and one of such vital importance to the success of the Law in developing an industry in oyster culture on the barren bottoms of the State, that the Commission, through its counsel, Thomas H. Robinson, secured the opinion of the Attorney-General, Hon. Isaac Lobe Straus, with reference to it. That it is the opinion of the Attorney-General that *the law gives to lot holders the right to take planted oysters from the lots leased by them at any time and in any manner they may desire* is seen by the extracts from the correspondence on the subject, printed herewith.

OFFICES OF
THE ATTORNEY-GENERAL
BALTIMORE, MARYLAND

January 23, 1909.

HON. THOMAS H. ROBINSON,
Counselor at Law,
Bel Air,
Harford County, Md.

DEAR SENATOR ROBINSON:—

. . . . . .

Under Section 112 of the Acts of 1906, I consider that the lessees of lots leased by the State under the provisions of the Act have the right to take up oysters at such times and in any manner they see fit. This would certainly include the means specified in your opinion, as stated in your letter to me.

This Act for the cultivation of oysters, being designed both for the promotion of greater industry and for the increase of the revenues of the State ought to be liberally and constructively, and not technically and obstructively, interpreted and enforced, so as to effectuate as fully as possible the important ends it has in view.

I announced this view and construction of the statute at the Cabinet Meeting on Wednesday last at the Governor's office, to the State officials, including the

members of the Shell Fish Commission and, upon special recommendation by me, the Governor directed the Commander of the State Fishery Force to enforce the Act accordingly.

. . . . . .

. . . . . .

. . . . . .

. . . . . .

. . . . . .

Very truly yours,

(Signed) ISAAC LOBE STRAUS,
Attorney-General.

The portion of the letter written by Mr. Robinson, to which the Attorney-General makes reference in the above opinion, is as follows:

"I have given the opinion, some time since, that under Section 112 of Chapter 711 of the Acts of 1906, when construed in connection with the other section that creates the relation of landlord and tenant, that the lessee had the right to take oysters in any manner he desires, whether with dredge or tongs, and to use any power for the purpose of working their dredges."

AN ACT SETTING ASIDE CLAM ROCKS IN POCOMOKE SOUND.

(Approved April 6th.)

AN ACT to prescribe additional duties to be performed by the Board of Shell Fish Commissioners, to the duties already prescribed to them by Chapter 711, of the Acts of the General Assembly of Maryland of 1906.

SECTION 1. Be it enacted by the General Assembly of Maryland, that it shall be the duty of the Board of Shell Fish Commissioners, as soon after the passage of this Act as practicable to have laid out, surveyed, and designated on charts provided for such purpose, Grant Rock, Ware Rock, and Flat Rock, being clam rocks located in the waters of Pocomoke Sound, in Somerset County and State of Maryland, and shall cause to be marked and defined as accurately as practicable the limits and boundaries of each of the above named rocks, and they shall take true and accurate notes of said survey and make the report and perform all other duties connected with said survey as said duties are prescribed by Chapter 711 of the Acts of the General Assembly of Maryland of 1906, pertaining to natural oyster beds and bars.

SECTION 2. And be it enacted by the General Assembly of Maryland, that after said rocks shall have been surveyed, as provided in Section 1 of this Act, no part of them shall be leased to any person or persons for the purpose of planting, bedding or cultivating oysters *therein*, but they shall be reserved to the public in the State of Maryland for the sole purpose of taking clams therefrom and shall be treated in every particular as are the natural oyster beds or bars which have been or shall be surveyed by the Board of Shell Fish Commissioners, under Chapter 711 of the Acts of the General Assembly of Maryland of 1906.

SECTION 3. And be it further enacted, that this Act shall take effect from the date of its passage.

ACT REPEALING CALVERT COUNTY CULTIVATION LAW.

(Approved April 8th.)

AN ACT to repeal Chapter 367 of the Acts of 1906.

SECTION 1. Be it enacted by the General Assembly of Maryland, that Chapter 367 of the Acts of the General Assembly of Maryland, passed at the session of 1906, entitled "An Act to repeal and re-enact with amendments, Section 46 of Article 72 of the Code of Public General Laws, title 'Oysters,' as amended by the Acts of the General Assembly of Maryland of 1904, Chapter 598," so far as the same applies to the Patuxent River, be and the same is hereby repealed.

SECTION 2. And be it enacted that this Act shall take effect from the date of its passage.